Section 22 - Planning Assistance to States Program

New Hampshire Dredged Material Management Study

July 1993

US Army Corps
of Engineers
New England Division

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	July 1993	Sec. 22-Planning Assistance to States

4. TITLE AND SUBTITLE
New Hampshire Dredged Material Management Study

5. FUNDING NUMBERS

6. AUTHOR(S)
John Kedzierski

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Corps of Engineers, New England Division
424 Trapelo Road
Waltham, MA 02254-9149

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Corps of Engineers, New England Division
424 Trapelo Road
Waltham, MA 02254-9149

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
conducted under the authority contained in the Section 22, Planning Assistance to States Program at the request of the New Hampshire Office of State Planning.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release
Distribution is unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

The purpose of this study is to evaluate and document the current and projected future dredging and dredged material disposal requirements of New Hampshire to provide the framework for future efforts to assess the need for an open ocean disposal site or sites. It was determined that over the next 50 years Hampton-Seabrook Harbor may require dredging of about 1,140,000 cubic yards of material; Little Harbor, depending on need, 270,000 cubic yards; Portsmouth Harbor/Piscataqua River, 640,000 cubic yards; and Rye Harbor, 132,400 cubic yards. A more complete analysis of future trends is contained in Section 3: "Historic Dredging and Future Projections".

14. SUBJECT TERMS
Dredged Materials, dredging, Hampton Harbor, Little Harbor, Portsmouth Harbor/Piscataqua River, Rye Harbor

15. NUMBER OF PAGES
64

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	

New Hampshire Dredged Material

Management Study

Prepared by:

U.S. Army Corps of Engineers
New England Division
Planning Directorate

EXECUTIVE SUMMARY

The Corps of Engineers was requested by the New Hampshire Office of State Planning to conduct a dredged material management study to assess the need for an open water disposal site or sites. This effort was conducted under the authority contained in the Section 22, Planning Assistance to States Program.

The purpose of this investigation is to evaluate and document the current and projected future dredging and dredged material disposal requirements of the State of New Hampshire to provide the framework for future efforts to assess the needs for an open water disposal site or sites.

The scope of work for this dredged material management study included:

1) Documenting the historic frequency, magnitude, dredging and disposal methods, and identifying who accomplished the dredging for each of the projects. The physical and chemical characteristics of the material were also summarized and documented, where available;

2) Determining the future volume and frequency of dredging required from existing projects;

and, 3) Documenting the historical process for establishing and prioritizing dredging needs and coordinating dredging and dredged material disposal activities between the Corps of Engineers and the State.

The harbors identified for investigation in this study included: 1) Hampton Harbor, 2) Little Harbor, 3) Portsmouth Harbor/Piscataqua River, and 4) Rye Harbor. Section "II. Existing Projects" contains a brief description of Federal and State dredging activities which have previously occurred within each harbor. Federal and State dredging operations are the focus of this Section 22 study.

A database of historical dredging activities has been compiled and is described in Appendix A. A review of dredging activities within each of the subject harbors was accomplished and the future projections are based on historical trends identified in the database. A review of sediment characteristics and environmental considerations and issues at each of the harbors is contained in Appendix B.

Future dredged material volumes for each harbor are based on the past maintenance dredging activities at each of the Federal and State projects located in those harbors. A linear projection of past dredging activities was used to obtain estimated volumes of dredged material to the year 2042. It was assumed for this analysis that all

future Federal and State maintenance dredging is covered within the linear projection.

It was determined that over the next 50 years Hampton-Seabrook Harbor may require dredging of about 1,140,000 cubic yards of material; Little Harbor, depending on need, 270,000 cubic yards; Portsmouth Harbor/Piscataqua River, 640,000 cubic yards; and Rye Harbor, 132,400 cubic yards. A more complete analysis of future trends is contained in Section "III. Historic Dredging and Future Projections".

The dredging and dredged material disposal process within New Hampshire and the State's coordination with the Corps of Engineers is discussed in Section "IV. Dredging and Dredged Material Disposal Process".

This report details past dredging activities and projects future dredging based on historic trends. It is only the first step in assessing the needs for an open water disposal site and for developing a comprehensive dredging and dredged material management strategy. Further investigations are necessary to identify and evaluate the various dredged material disposal options available for the material found in each harbor and to determine if the designation of an open water disposal site or sites for New Hampshire's harbors is required.

New Hampshire Dredged Material Management Study

Section 22 Planning Assistance to States Program

Table of Contents

New Hampshire Dredged Material Management Study

Section 22 Planning Assistance to States Program

Table of Contents (cont.)

New Hampshire Dredged Material Management Study
Section 22 Planning Assistance to States Program

I. INTRODUCTION

Study Background

The State of New Hampshire originally requested the Corps of Engineers to conduct a dredged material management study to assess the need for open ocean disposal sites. However, determining the site of an open ocean disposal facility requires a Zone of Siting Feasibility Study as described in Revised Procedural Guide For Designation Surveys of Ocean Dredged Material Disposal Sites, Technical Report D-90-8, Department of the Army, April, 1990. For purposes of this study, an open ocean disposal site is defined as any potentially suitable ocean site located within the boundaries delineated by the Zone of Siting Feasibility Study. The Zone's boundaries are determined by, but are not limited to, navigation restrictions, political or other jurisdictional boundaries, distance to the edge of the continental shelf, the feasibility of monitoring, and operational and transportation costs. The scope of a Zone of Siting Feasibility Study is described below:

1) Estimating and describing the quantity, quality, character, and future volumes of the dredged material which will require disposal.

2) A screening process to identify potential disposal sites for the dredged material for the purpose of either the containment or dispersal of sediments.

3) An economic evaluation including identification of benefits and costs to determine the most economically feasible sites of those identified in the screening process.

4) A preliminary determination of the compatibility of the dredged material to potential disposal sites.

5) The identification of alternative disposal options for dredged material not compatible with the candidate offshore disposal sites.

The first item, documenting and describing the dredged material from Federal and State projects based on historical records and trends is accomplished within this Section 22 study effort. The selection of a dredged material disposal management strategy must also consider the nature and characteristics of the sediment to be dredged, potential environmental impacts of the disposal of the material, nature and degree of contamination, dredging equipment, project scope and size, including the technical feasibility, economic and other socioeconomic factors.

The information contained within this report and generated throughout the course of this study will be used as input to the Maine-New Hampshire Dredged Material Management Study which is presently being conducted by the Corps of Engineers, New England Division.

Study Authority

The Corps of Engineers was requested by the New Hampshire Office of State Planning to conduct a dredged material management study for the State of New Hampshire under the authority contained in the Section 22, Planning Assistance to States Program.

Study Purpose and Scope

The purpose of this investigation is to evaluate and document the current and projected future dredging and dredged material disposal requirements of the State of New Hampshire to provide the framework for future efforts to assess the need for an open ocean disposal site or sites.

The overall scope of work for this Dredged Material Management Study is summarized below. However, this report is limited to providing documentation on data collection, determining future conditions, and addressing the dredging and dredged material disposal process.

a. Data Collection

Identify and describe the existing Federal, and State projects which have historically required the removal of material from the ports, and harbors of the State of New Hampshire. Document the historic frequency, magnitude, dredging and disposal methods, their costs, and identify who accomplished the dredging for each of the projects. The physical and chemical character of the material is also documented, where available.

b. Future Conditions

Determine the future volume and frequency of dredging required from existing projects.

c. Dredging and Dredged Material Disposal Process

Document the historical process for establishing and prioritizing dredging needs and coordinating dredging and dredged material disposal activities between the Corps of Engineers and the State.

Pertinent Investigations

There have been studies accomplished by other agencies pertaining to the assessment of New Hampshire's needs for an open ocean disposal site. Specifically the "Cape Arundel Disposal Site Needs Analysis (Draft)" was prepared in 1991 for the U.S. Environmental Protection Agency (EPA), Region I, by Metcalf & Eddy, Inc.. This study was undertaken as part of the EPA's analysis of the need to designate a permanent dredged material disposal site in the Gulf of Maine. The EPA anticipates that this site would serve the coasts of Maine, New Hampshire, and Massachusetts from Cape Ann (Massachusetts) north to Cape Elizabeth (Maine).

The Cape Arundel Disposal Site Alternative Technical Appendix was prepared in 1990 for the U.S. Environmental Protection Agency (EPA), Region I, by Metcalf & Eddy, Inc.. It was conducted to examine the feasibility of a variety of alternative disposal sites. Ocean disposal was determined to be the only economically feasible, long-term disposal option for the New Hampshire ports studied. The "Cape Arundel Disposal Site Needs Analysis (Draft)" study was undertaken to determine if there are any economically viable options to the Cape Arundel Disposal Site. The study found that upland disposal would not be an economically viable alternative to ocean disposal at the Cape Arundel Disposal Site in the future. Metcalf & Eddy's study found that only one port in New Hampshire, Portsmouth Harbor, may require use of the Cape Arundel Disposal Site within the next 20 years. The EPA study also determined that the alternative ocean disposal sites, the Massachusetts Bay Disposal Site and the Portland Dump Site, might be economically feasible alternatives for projects proposed at Portsmouth Harbor. This does not mean that Federal projects conducted at Portsmouth Harbor will use any of these particular sites for future disposal, only that they appear viable. The identification of a potential disposal site does not obligate its use by the Corps of Engineers for maintenence or improvement dredging unless it meets required environmental laws and regulations in the least costly manner consistent with sound engineering practices. The "Cape Arundel Disposal Site Needs Analysis (Draft)" report has not been finalized, and its findings are preliminary. According to this report there are no plans for using the Cape Arundel Disposal Site (CADS) for any other harbors within New Hampshire. Pertinent information contained in the "Cape Arundel Disposal Site (CADS) Needs Analysis (Draft)" was incorporated into the database of dredging activities contained in Appendix A.

The New Hampshire Long Range Dredge Management Study was prepared in 1982 for the New England Governor's Conference by Costello, Lomasney, and deNapoli, Incorporated. This study reviewed historical dredging accomplished at Portsmouth, Little, Rye, and Hampton Harbors, projected future dredging requirements, and recommended implementing a dredging management strategy. This strategy is discussed further in Section "V. Dredging and Dredged Material Disposal Process".

II. EXISTING PROJECTS

Project Descriptions

The harbors identified for investigation in this study include: 1) Hampton Harbor, 2) Little Harbor, 3) Portsmouth Harbor/Piscataqua River, and 4) Rye Harbor . Figures 1 through 4 are Vicinity Maps for these harbors and provide a general location of past dredging activities. The numbers shown on the map correspond to the "Record Number" of each individual dredging activity entered in the database. Tables 1 through 3 are summaries of dredging activities at each of the harbors. They list the record number, total volume of material, material type, and the dredging and disposal methods for each of the projects. A more detailed record of dredging activities within the harbors is contained in Appendix A. The physical and chemical character and pertinent environmental issues are briefly described for each of the harbors in Appendix B.

The following is a brief description of the Federal and State dredging activities which have occurred within each harbor.

1. HAMPTON-SEABROOK HARBOR

Hampton Harbor in Hampton is situated behind Seabrook Beach and Hampton Beach, about 1.5 miles north of the New Hampshire-Massachusetts state line. Hampton Harbor lies at the confluence of the Hampton and Blackwater Rivers. The entrance to Hampton Harbor separates Seabrook and Hampton Beaches and forms the mouth of the Hampton River. (See Figure 1.) A small lobstering fleet and numerous recreational craft and charter fishing boats are serviced by two public landings, a small marina, a boat club, and three boat rental facilities.

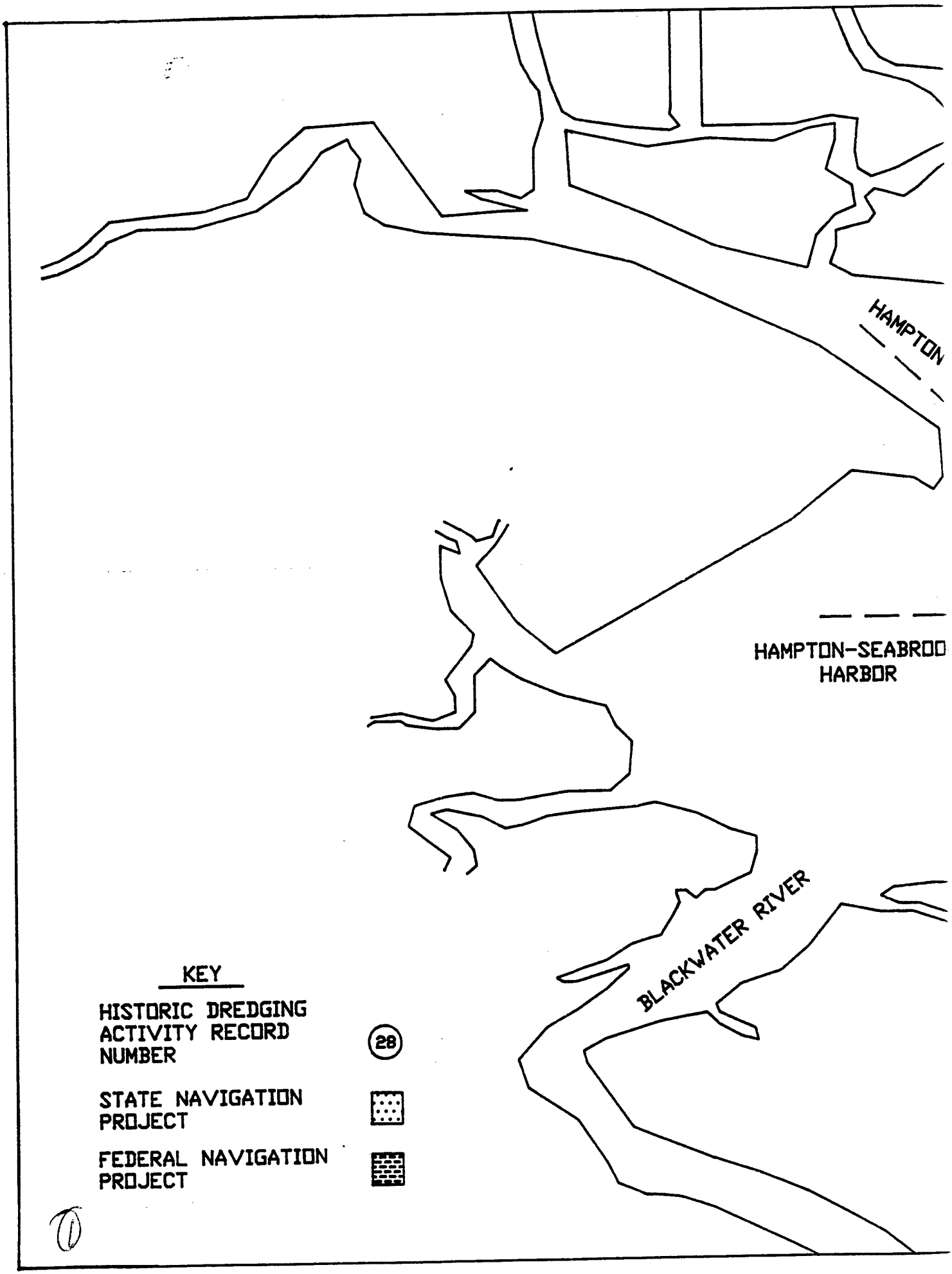
Federal Dredging Projects

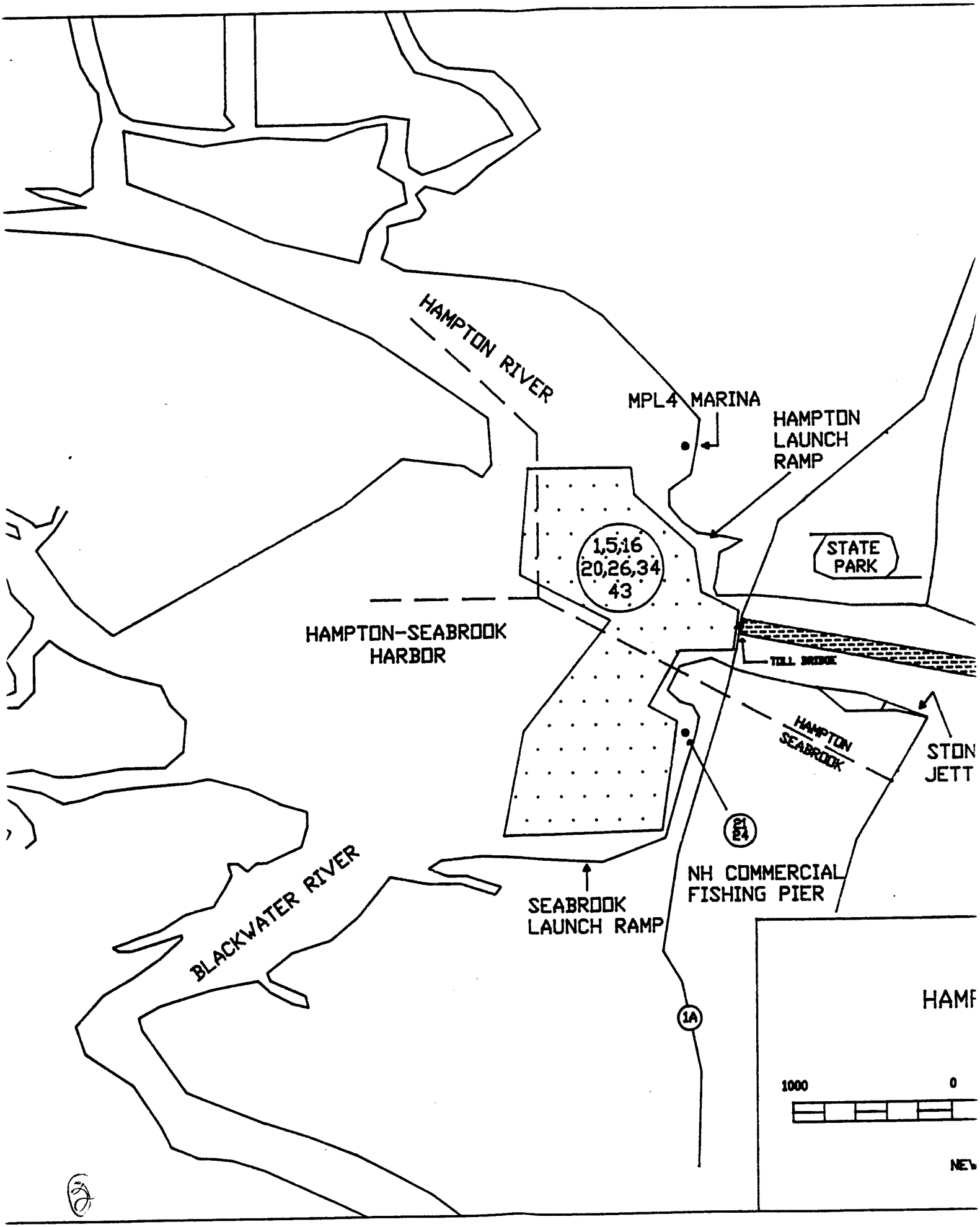
There are seven piers within Hampton Harbor. The State of New Hampshire maintains two pile and timber piers, one in Hampton about 1,500 feet north of the entrance, and one in Seabrook, one-half mile south of the entrance. There is one landing open to the public.

Adopted in February 1964 by the Chief of Engineers under authority of Section 107 of the Continuing Authorities Program, and completed in November, 1965, the completed project involved:

- Constructing a 0.7 mile long channel, 8-feet deep and 150-feet wide, extending from the ocean through the entrance to the harbor.

- Extending the 1300 foot long existing state-built stone north jetty 1100 feet southeasterly, with a 200 foot spur normal to the jetty axis at its outer end, all to an elevation of 12 feet above mean low water.


HAMPTON
HAMPTON-SEABROO
HARBOR
BLACKWATER RIVER
KEY
HISTORIC DREDGING ACTIVITY RECORD NUMBER
28
STATE NAVIGATION PROJECT
FEDERAL NAVIGATION PROJECT


HAMPTON RIVER
MPL4 MARINA
HAMPTON LAUNCH RAMP
STATE PARK
1,5,16
20,26,34
43
HAMPTON-SEABROOK HARBOR
TOLL BRIDGE
HAMPTON SEABROOK
STON
JETT
NH COMMERCIAL FISHING PIER
SEABROOK LAUNCH RAMP
BLACKWATER RIVER
1A
HAMF
1000
0
NE

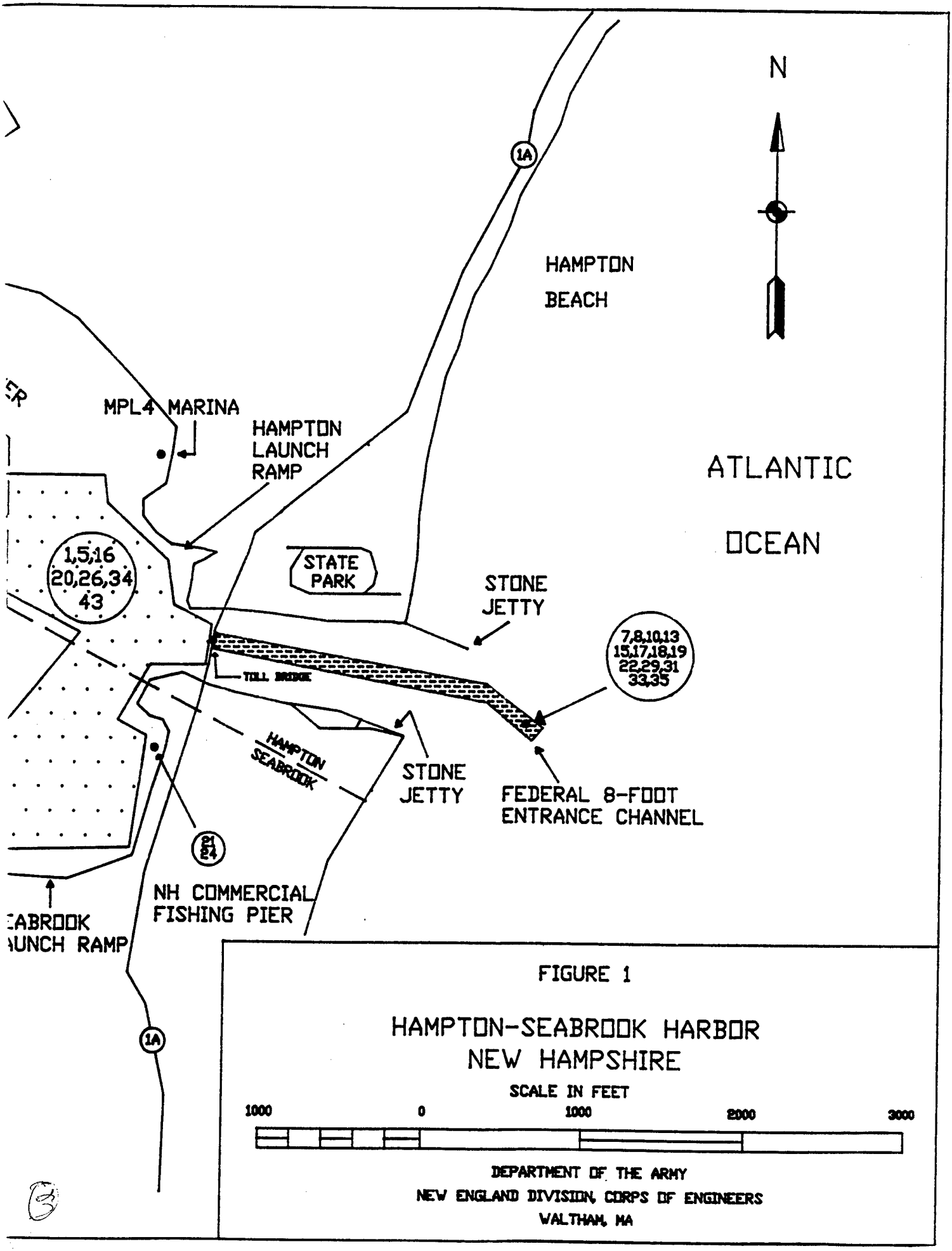


FIGURE 1

HAMPTON-SEABROOK HARBOR
NEW HAMPSHIRE

SCALE IN FEET

1000 0 1000 2000 3000

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MA

Table 1

Hampton–Seabrook Harbor
Dredging Activities

Record Number	Permittee	Date	Total Volume	Method Type	Material Type	Project Type	Disposal Type
7	Federal	30–Jun–65	29,400	Mechanical	Sand	New	Open water
8	Federal	15–Nov–65	30,934	N/A	Sand	Maintenance	Nearshore
10	Federal	15–Apr–68	17,400	Mechanical	Sand	Maintenance	Open water
13	Federal	15–Jun–71	15,530	Mechanical	Sand	Maintenance	Open water
15	Federal	15–Apr–73	15,070	Suction	Sand	Maintenance	Open water
17	Federal	22–Apr–74	17,430	Suction	Sand	Maintenance	Open water
18	Federal	05–May–75	21,070	Suction	Sand	Maintenance	Open water
19	Federal	29–Apr–76	14,065	Suction	Sand	Maintenance	Open water
22	Federal	02–May–77	7,400	Suction	Sand	Maintenance	Open water
29	Federal	15–Jul–81	23,800	Suction	Sand	Maintenance	Open water
31	Federal	30–Jun–82	26,200	Mechanical	Sand	Maintenance	Open water
33	Federal	15–Jul–84	27,900	Hydraulic	Sand	Maintenance	Upland
35	Federal	15–Sep–87	23,468	Hydraulic	Sand	Maintenance	Open water
1	State of New Hampshire	23–Jun–55	109,000	N/A	Sand	Maintenance	Upland
5	State of New Hampshire	30–May–65	110,000	N/A	Sand	Maintenance	Upland
16	State of New Hampshire	14–Aug–73	58,600	Suction	Sand	Maintenance	Upland/nearshore
20	NH Dept of Resources & Economic Development	11–May–76	5,000	N/A	N/A	Improvement	Upland
21	Public Service Company of New Hampshire	03–Sep–76	30,000	Suction	Sand	New	Nearshore
24	Hampton Commercial Fish Pier	30–Jun–77	9,000	Suction	Sand	Improvement	Upland
26	NH Dept of Resources and Economic Development	08–Feb–79	76,310	Suction	Sand	Maintenance	Upland
34	NH Dept of Transportation	30–May–87	59,135	Suction	Sand	Maintenance	Upland
43	NH Dept of Resources & Economic Development	03–Aug–92	80,000	Suction	Sand	Maintenance	Upland

N/A: Information not available.

- o Raising the outer 300 feet of the existing state-built 1000 foot long south jetty to elevation 16 feet above mean low water and constructing a 180 foot long spur at the inner end southerly to high ground.

Material dredged from construction of the channel was placed at the northern end of Hampton Beach in conjunction with the Corps' beach replenishment project. A walking surface was constructed on the top of the north jetty extension for fishing.

Maintenance of the Federal project has taken place twelve times since construction in 1965. The most recent maintenance dredging took place in 1987. Table 1 provides a historic account of dredging activities at this harbor and includes the Federal maintenance projects. Dredged material type and dredging and disposal methods are also outlined in Table 1.

Prior Federal Investigations

1. 1889 - Annual Report of the Chief of Engineers; unfavorable report for improving the river to Hampton Village.

2. 1903 - House Document No. 247, 58th Congress, 2nd Session; unfavorable report for improvement of the river.

3. 1930 - An unpublished report recommending against a plan for stabilizing the river mouth and protecting adjacent beaches against erosion.

4. 23 March 1956 - Considered navigation improvements at both Rye Harbor and Hampton Harbor. Recommended surveys of both locations to determine the extent and cost of any warranted improvements.

5. 30 July 1963 - Small Navigation Project, Hampton Harbor, Detailed Project Report. Recommended Federal project, as described above.

6. 26 March 1964 - Survey (Review of Reports) on Hampton River and Harbor, New Hampshire.

State Dredging Projects

Maintenance dredging conducted by the State of New Hampshire has historically been disposed of on Hampton Beach and south of the Federal channel. The Department of Resources and Economic Development has recently been issued a permit to dredge about 80,000 cubic yards of sand. The material will be disposed of on Hampton Beach in four separate locations. The state project area consists of anchorages and access channels which are maintained to minus 6' Mean Low Water. The project covers approximately 22 acres and extends north from the Seabrook Launch Ramp to near the MPL4 marina.

A summary of historic dredging activities in Hampton-Seabrook Harbor is contained in Table 1. A more complete and detailed database of dredging information is shown in Appendix A.

Environmental Review

A brief review of material type, disposal areas and other environmental considerations such as water quality and biological resources is given in Appendix B.

2. LITTLE HARBOR

Little Harbor is situated between the island of New Castle to the north and Rye to the south. (See Figure 2.) The harbor's northwesterly end, located at the bascule bridge (Route 1B, New Castle Avenue), leads into the southerly end of Portsmouth Harbor. Little Harbor is used today mostly as an access route for recreational and charter fishing boats and other small craft located at nearby Sagamore Creek to the northwest of the harbor. The anchorage now receives limited use by recreational and charter fishing boats because of exposed entrance channel conditions.

The original purpose of the project was to provide a safe harbor of refuge for commercial sailing schooners as they waited for moderate tides in Portsmouth Harbor around the turn of the century. However, the commercial sailing vessels for which the project was designed were phased out of existence in the late 1920's.

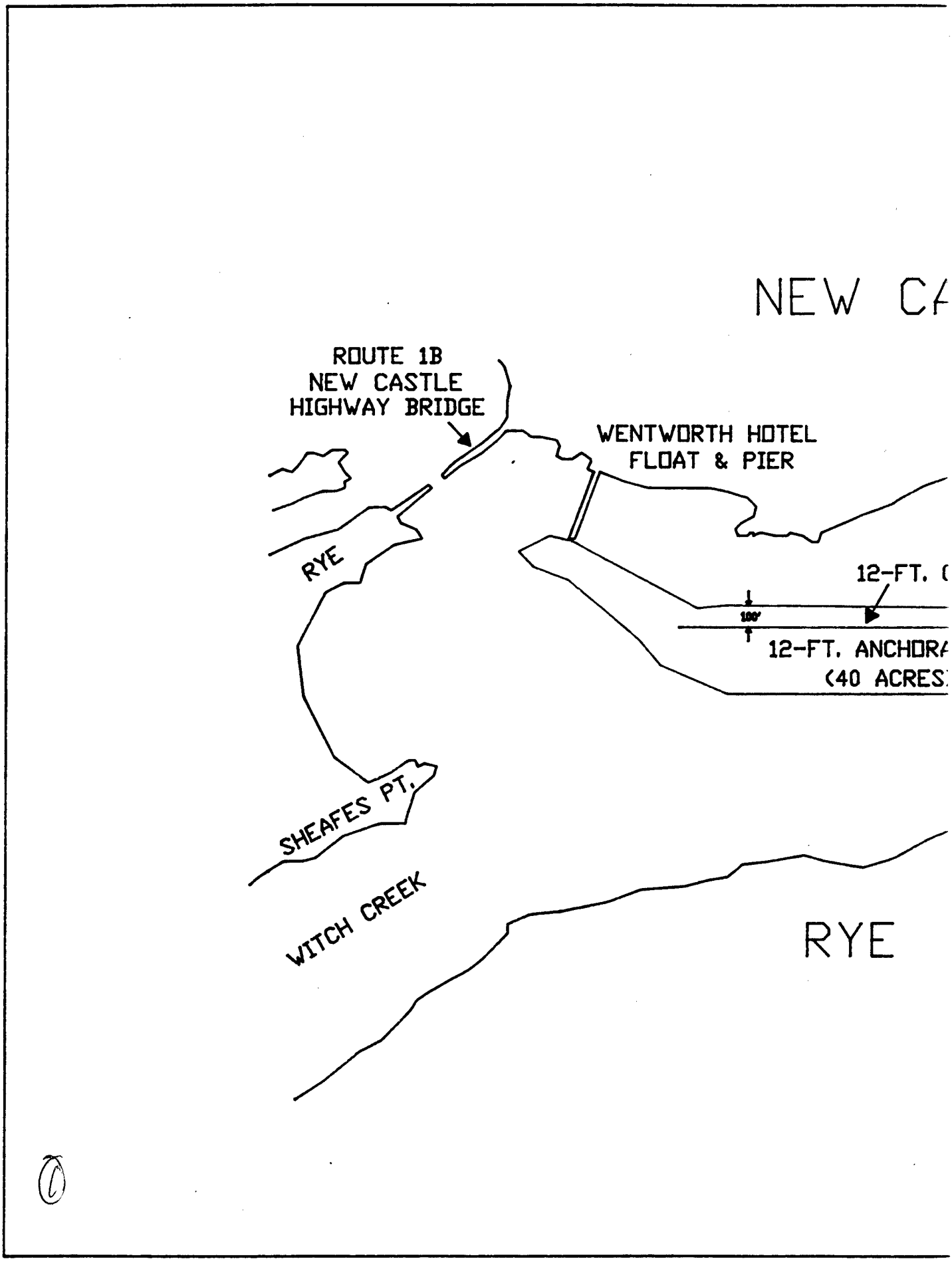
A survey of Little Harbor was conducted in 1882 and a plan of improvement proposed for an entrance channel 9' deep at low tide and 100' wide. Before any improvements, the depth of the harbor was only 6' at low tide and the anchorage was small and exposed. The Corps of Engineers approved the project in 1886 and modified in 1887 to include the two stone breakwaters and a 49 acre anchorage at a 12' mean low water depth. The project was further modified in 1894 by reducing the size of the anchorage from 49 acres to 40 acres and the entire project was eventually completed in 1903. The project consists of:

- Two stone breakwaters at the entrance to the harbor. The north breakwater, off Jaffrey Point in New Castle, is 550 feet long. The south breakwater, off Frost Point in Rye, is 900 feet long. They were completed in 1894.

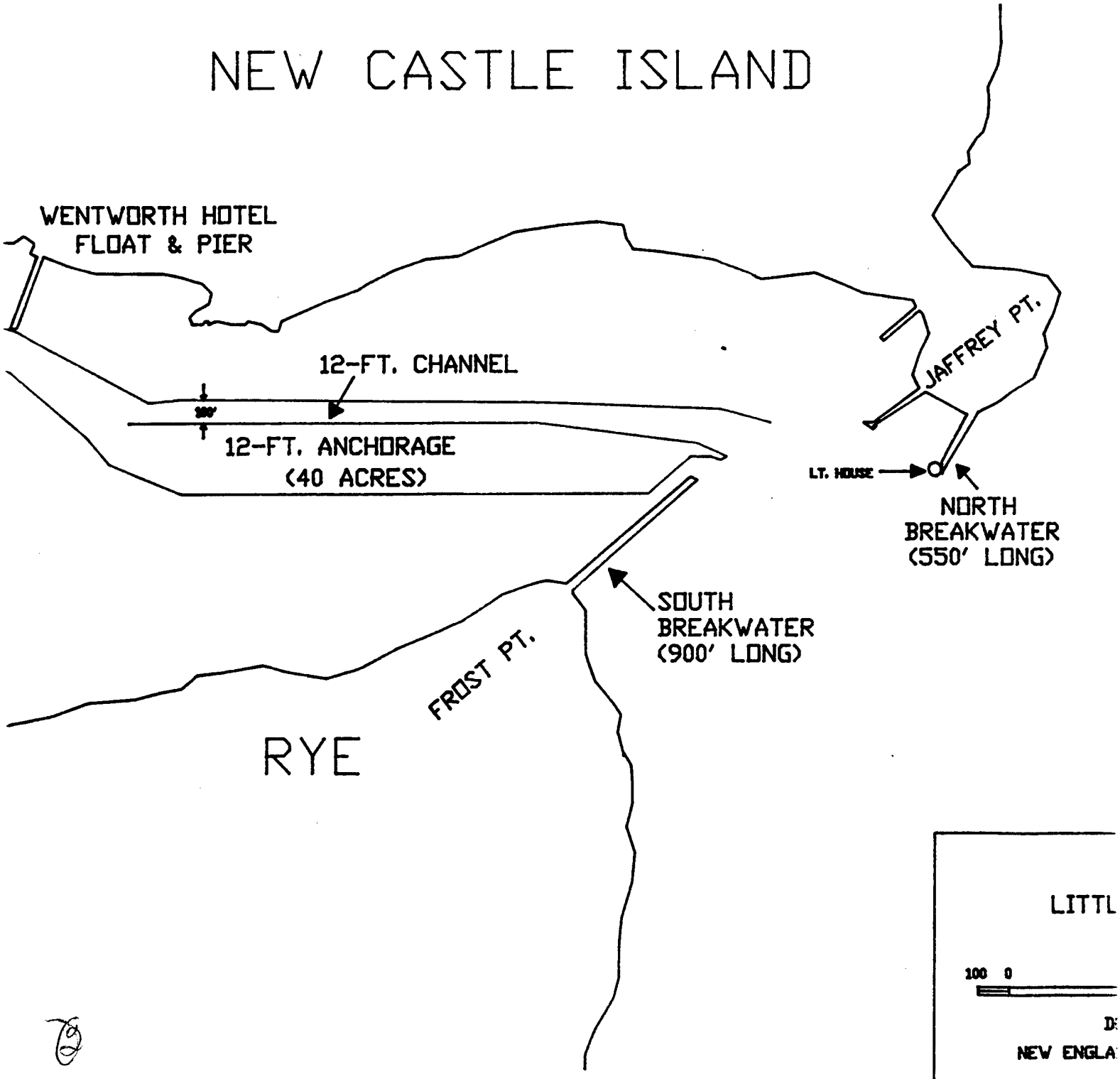
- A 3000-foot long entrance channel, 12-feet deep and 100-feet wide extending through the harbor to the vicinity of the bascule bridge.

- A 12-foot deep anchorage basin, 700-feet long and 300-feet wide, lying immediately south of the entrance channel.

Between 1888 and 1903 approximately 439,546 cubic yards of material was removed during construction of the original project which was completed in 1903. There is one dock owned by private concerns located on the north shore of the harbor. There has been no maintenance dredging of the Federal project since its completion. However, the north and south breakwaters were repaired in February, 1976 by the Corps of Engineers. The project extending from the Route 1B bascule bridge north and west to Sagamore Creek and past Leachs Island is part of the Federal navigation project within Portsmouth Harbor and Piscataqua River. This is described in further detail in the following section. There has been recent discussions between the Corps of Engineers and the New Hampshire Port Authority concerning the possibility of dredging the Federal navigation project. Based on a survey of the harbor completed in 1989, it is estimated that the removal of about 270,000 cubic yards of mainly clean fine sand is required to bring the project back to authorized dimensions.


NEW CA
ROUTE 1B
NEW CASTLE
HIGHWAY BRIDGE
WENTWORTH HOTEL
FLOAT & PIER
RYE
12-FT. (
100'
12-FT. ANCHORA
(40 ACRES
SHEAFES PT.
WITCH CREEK
RYE

0


NEW CASTLE ISLAND
WENTWORTH HOTEL
FLOAT & PIER
12-FT. CHANNEL
12-FT. ANCHORAGE
(40 ACRES)
JAFFREY PT.
LT. HOUSE
NORTH
BREAKWATER
(550' LONG)
SOUTH
BREAKWATER
(900' LONG)
FROST PT.
RYE
LITTL
100 0
D
NEW ENGLA

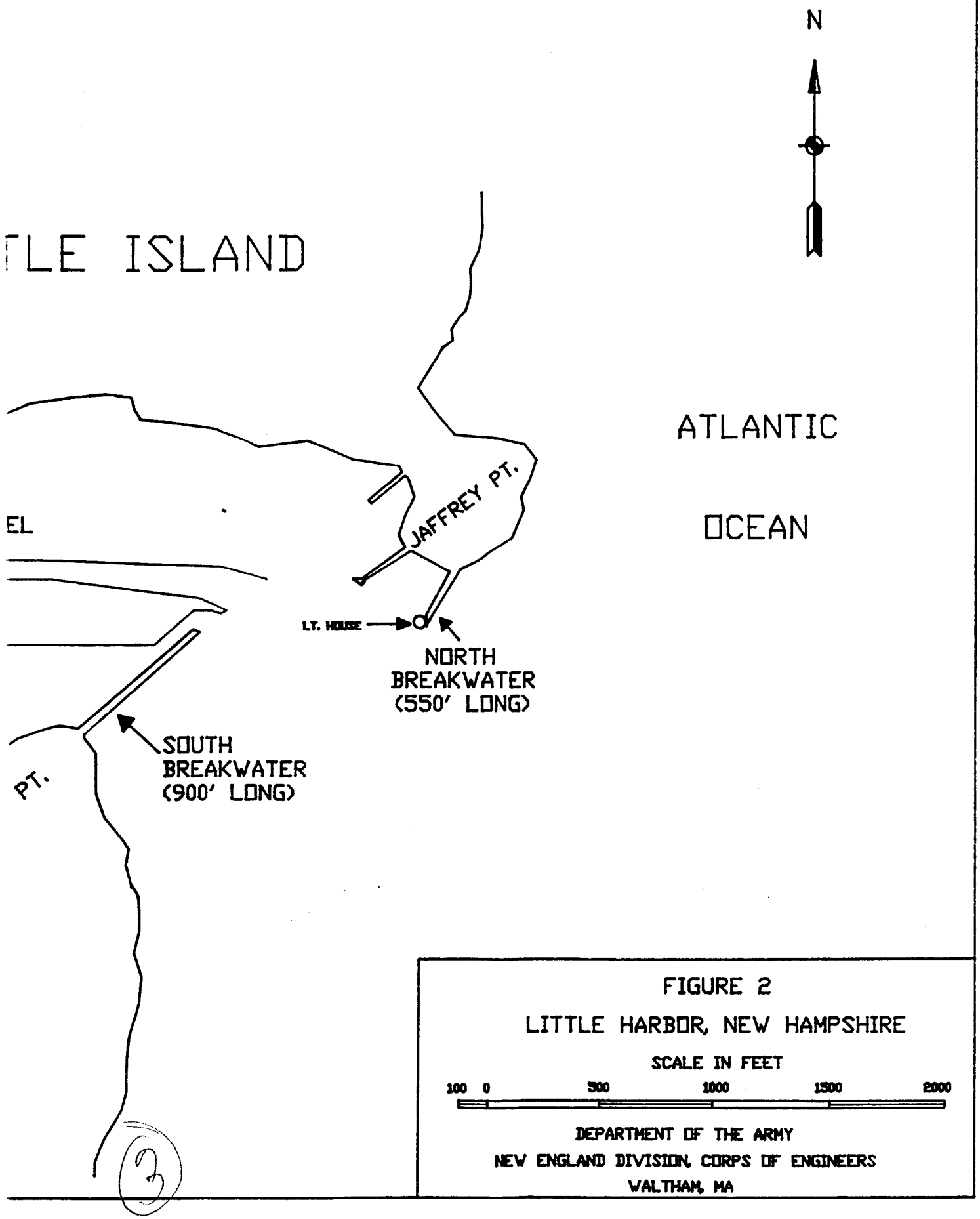


FIGURE 2

LITTLE HARBOR, NEW HAMPSHIRE

SCALE IN FEET

100 0 500 1000 1500 2000

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MA

3

However, this is only an estimate, and a complete evaluation of the project's purpose and requirements are necessary to determine future dredging needs and project dimensions.

Prior Federal Investigations

1. 1882 - Preliminary examination recommending improvement of the harbor.

2. 1884 - Preliminary examination favoring improvement of the harbor.

3. 1926 - House Document No. 467, 69th Congress, 1st Session; Recommended eliminating any possible future maintenance dredging of the project because the project had outlived its usefulness. However, this recommendation was never acted upon.

4. 1968 - Survey (Review of Reports); Recommended against further Federal study or modification of the existing project.

State Dredging Projects

A review of Corps of Engineers files has uncovered no State dredging activities within Little Harbor. The Federal channel has not received any maintenance dredging since its completion and there are no State channels or anchorages within the harbor.

Although there has been no Federal or State dredging within Little Harbor in recent years, a significant quantity of material was removed in the late 1980's by Wentworth-By-The-Sea. About 216,000 cubic yards of sand, gravel, and silt was dredged and disposed of at the Cape Arundel Disposal Site.

3. PORTSMOUTH HARBOR/PISCATAQUA RIVER

Formed by the confluence of the Salmon Falls and Cocheco Rivers, the Piscataqua River originates at the boundary of Dover, New Hampshire and Eliot, Maine, and flows southeasterly for 13 miles to Portsmouth Harbor, comprising a part of the border between the two states. (See Figure 3.) The downstream 8.8 miles of the Piscataqua River constitute Portsmouth Harbor, which stretches across New Castle, Portsmouth, and Newington, and the Maine communities of Kittery and Eliot.

Located about 50 miles northeast of Boston, Portsmouth Harbor is the sole deep draft harbor in New Hampshire. It handles about 3.5 million tons of shipping a year for New Hampshire, eastern Vermont, and southern Maine. Waterfront terminals are chiefly on the south bank of the Piscataqua River. Eighteen piers, wharves, and landings represent available terminals for handling the port's waterborne commerce. Items include petroleum products, iron and steel scrap, salt, limestone, and fish products. The harbor is also used by submarines from the Portsmouth Naval Shipyard in Kittery, Maine and previously for fuel deliveries to the former Pease Air Force Base in Newington. Portsmouth Harbor, subject to fast currents and sharp bends, is also used extensively by a large lobstering fleet, charter fishing vessels, commercial fishermen, excursion boats to the Isles of Shoals, and local and transient boats based at or visiting the nearly 20 boating facilities in the immediate tributary area.

Federal Dredging Projects

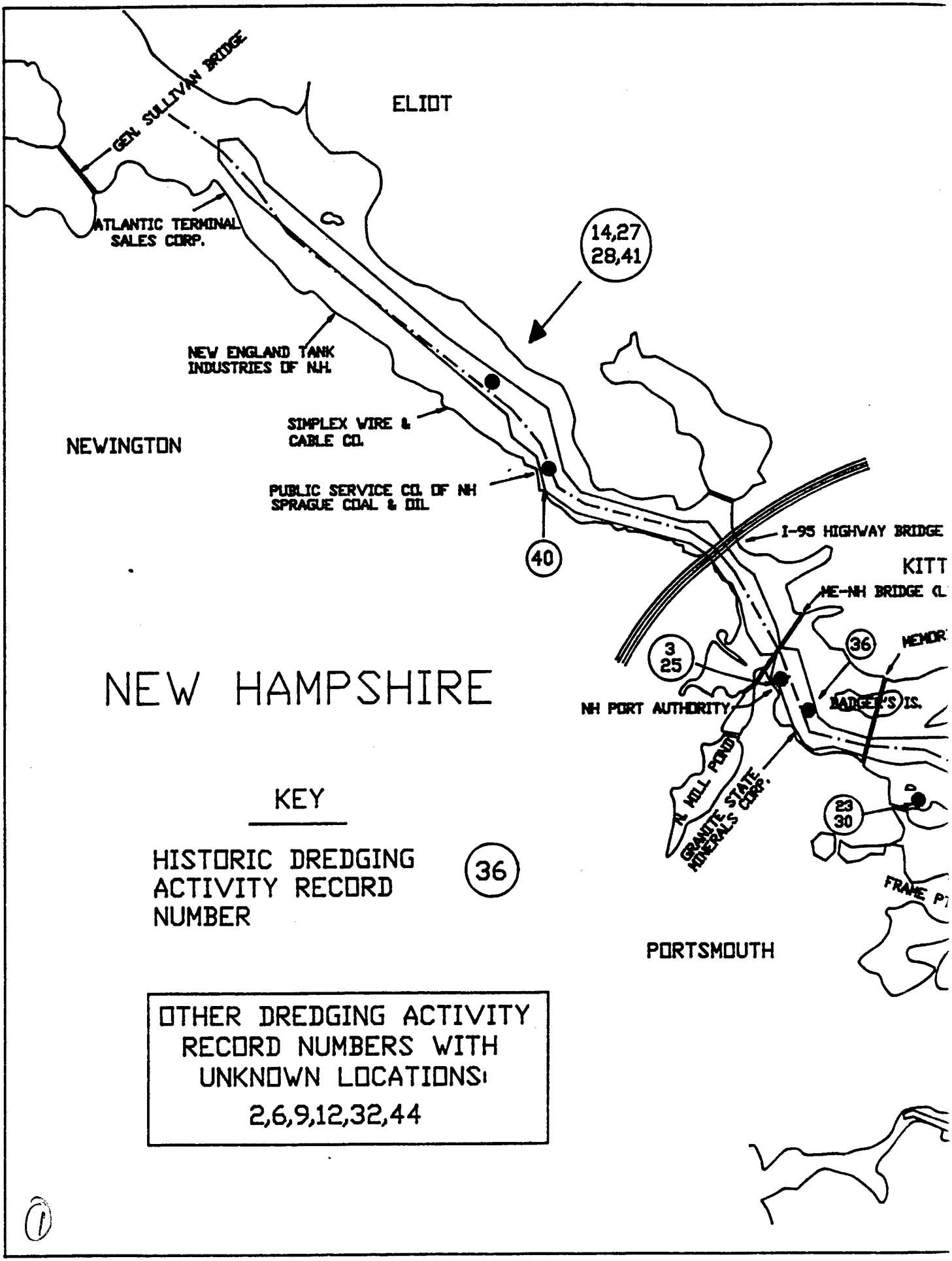
Initial Federal work in Portsmouth Harbor began in 1881. It consisted of:

- Constructing a 1000-foot long breakwater between New Castle and Goat Islands. The breakwater now serves as a causeway for an access road to New Castle.

- Removing two ledge areas in the middle of the harbor. One area, Gangway Rock, was opposite the western end of the Portsmouth Naval Shipyard, on the New Hampshire side of the channel. Removal of the ledge to a depth of 20 feet was completed in 1888. The second area was about 0.6 mile upstream, near the southwestern end of Badgers Island, on the Maine side of the channel. Removal of this ledge to a depth of 18 feet was completed in 1891.

The Corps of Engineers has completed three additional projects in Portsmouth Harbor. The first project, which was constructed under Section 107 of the 1960 River and Harbor Act, was completed in 1966 and consists of:

- A 6.2-mile long channel, 35-feet deep, and generally 400-600 feet wide, extending northwesterly from deep water between New Castle and Seavey Islands (approximately 2.6 miles from the mouth of the Piscataqua River) to a turning basin located about 1700 feet past the Atlantic Terminal Sales dock in Newington. The bends were widened to approximately 700 feet by removing ledge at Henderson Point, Gangway Rock, Badgers Island, the US Route 95 Bridge, and Boiling Rock (The small shoal at the US Route 95 Bridge was removed in 1969).


GEN. SULLIVAN BRIDGE
ELIOT
ATLANTIC TERMINAL SALES CORP.
14,27
28,41
NEW ENGLAND TANK INDUSTRIES OF N.H.
SIMPLEX WIRE & CABLE CO.
NEWINGTON
PUBLIC SERVICE CO. OF NH
SPRAGUE COAL & OIL
40
I-95 HIGHWAY BRIDGE
KITT
ME-NH BRIDGE
3
25
36
NEW HAMPSHIRE
NH PORT AUTHORITY
BADGER'S IS.
KEY
HISTORIC DREDGING ACTIVITY RECORD NUMBER
36
GRANITE STATE MINERALS CORP.
23
30
PORTSMOUTH
OTHER DREDGING ACTIVITY RECORD NUMBERS WITH UNKNOWN LOCATIONS:
2,6,9,12,32,44

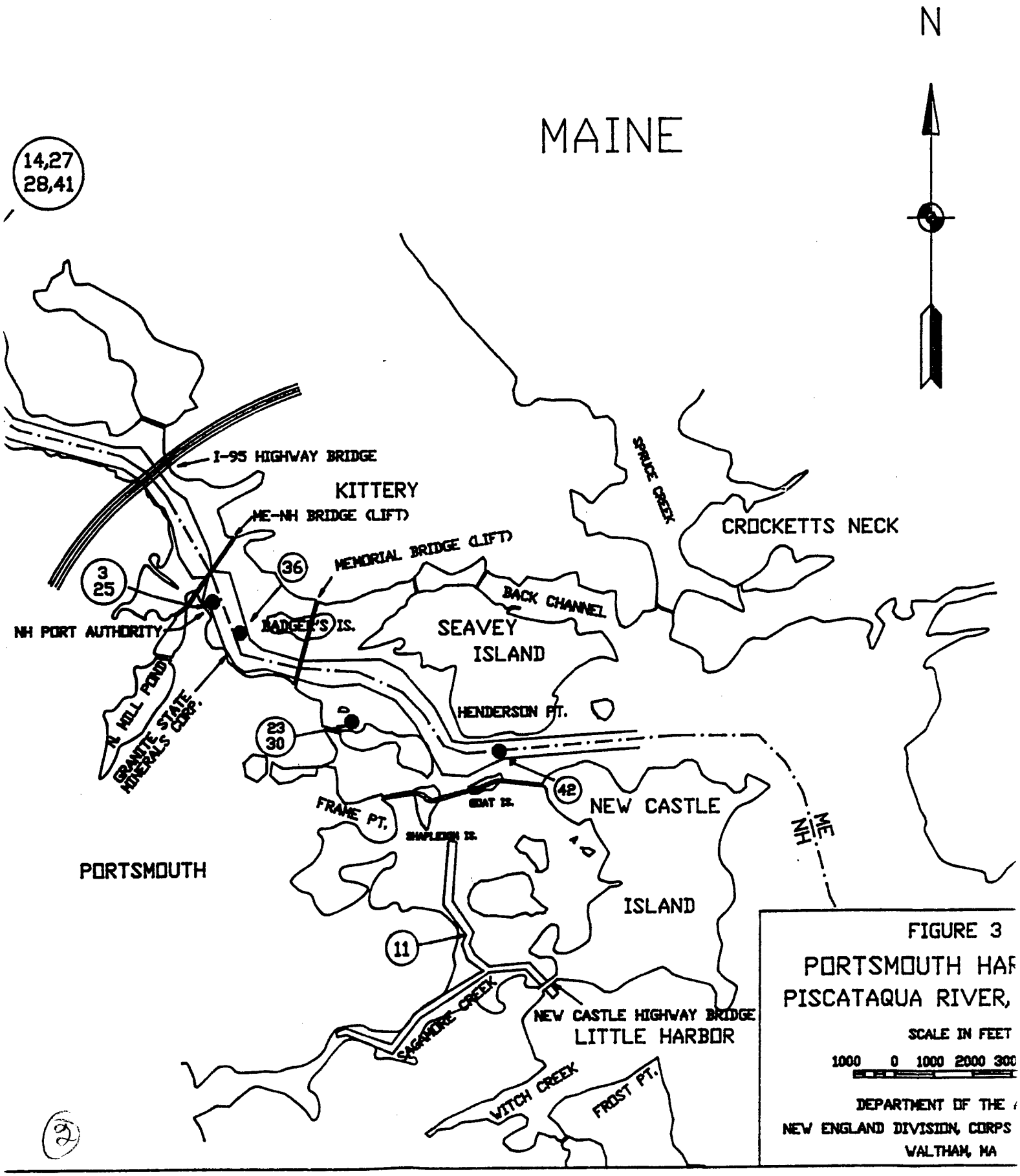


FIGURE 3

PORTSMOUTH HAF
PISCATAQUA RIVER,

SCALE IN FEET

1000 0 1000 2000 300

DEPARTMENT OF THE
NEW ENGLAND DIVISION, CORPS
WALTHAM, MA

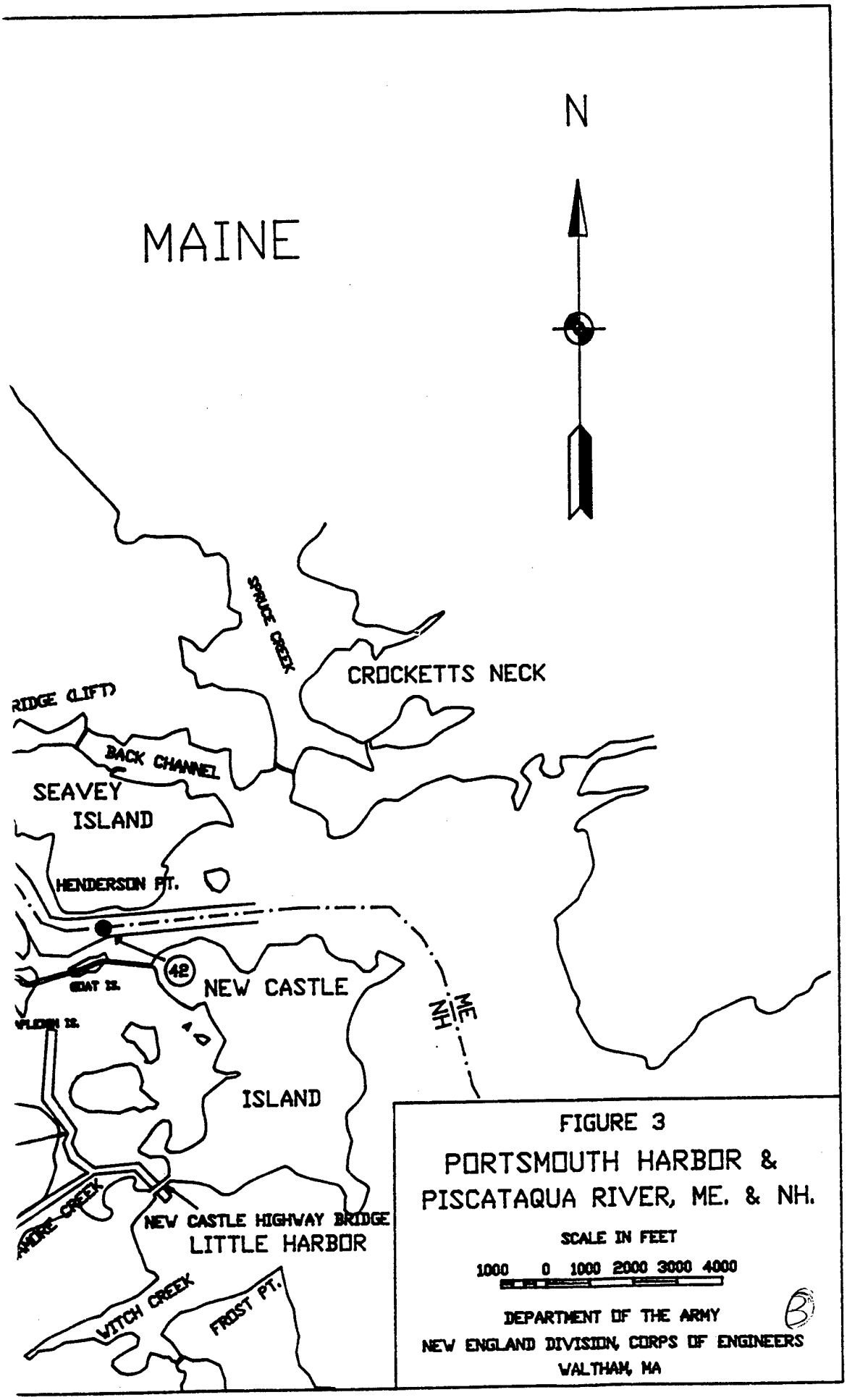


FIGURE 3

PORTSMOUTH HARBOR &
PISCATAQUA RIVER, ME. & NH.

SCALE IN FEET

1000 0 1000 2000 3000 4000

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MA

- Two 35-foot deep turning basins. The first turning basin is located above Boiling Rock and is 950 feet long. The second is situated at the end of the aforementioned 6.2-mile long channel in Newington and is 850 feet long.

The Corps of Engineers completed a second project in 1971 that serves a large recreational and small lobstering fleet based in the areas of Sagamore Creek, a popular boating center located at the southerly end of Portsmouth Harbor. This work, constructed as a small project under Section 107 of the Continuing Authorities Program, consists of:

- A 0.4-mile long main channel extending from Little Harbor, located immediately south of Portsmouth Harbor between New Castle and Rye, through the Bascule Bridge (Route 1B), then west to the mouth of Sagamore Creek. The channel is 6-feet deep and 100-feet wide. At Sagamore Creek, the channel forks into northerly and westerly channels, described below.

- A 75-foot wide northerly channel, 6-feet deep, extending 0.7 mile between Leachs Island and Portsmouth to deep water south of the bridge connecting Shapleigh and Goat Island.

- A 75-foot wide westerly channel, 6-feet deep, extending 0.9 mile up Sagamore Creek to the public landing at the Sagamore Avenue Bridge in Rye. A 6-foot deep anchorage, 3 acres in area, was constructed at the upper end of the channel.

Most recently the Corps of Engineers completed navigation improvements to the existing Federal project. This work included channel widening adjacent to Goat Island in 1992. This accounted for 51,139 CY of rock and unclassified material. Channel widening was also accomplished in 1989 near Badgers Island between the vertical lift bridges. This accounted for approximately 496,008 CY of sand, gravel and rock. Maintenance of this project has been accomplished seven times since 1970. The most recent maintenance dredging took place in 1991 in the vicinity of the Simplex facility. Disposal of the dredged material was in the river downstream from the site. Table 2 contains a listing of dredging activities within Portsmouth Harbor/Piscataqua River which includes improvement and maintenance of the Federal projects described above.

Prior Federal Investigations

1. 1873 - House Ex. Document No. 84, 43th Congress, 1st Session; Favorable preliminary examination for breakwater between Gerrish and Wood Islands.

2. 1878 - Sen. Ex. Document No. 29, 45th Congress, 3rd Session; Favorable survey for closing channel between Goat Island and New Castle Island, and removing a portion of Gangway Rock and part of Badgers Island.

3. 1882 - Sen. Ex. Document No. 30, 48th Congress, 1st Session; Unfavorable preliminary examination and survey for extension of breakwater between Goat Island and New Castle Island.

Table 2

Portsmouth Harbor/Piscataqua River Dredging Activities

Record Number	Permittee	Date	Total Volume	Method Type	Material Type	Project Type	Disposal Type
2	Federal	30-Jun-57	31,684	N/A	N/A	New	N/A
6	Federal	30-Jun-65	453,200	Mechanical	Rock, Ordinary material	Improvement	N/A
9	Federal	15-Jan-66	209,098	Mechanical	Rock, Ordinary material	Improvement	N/A
12	Federal	15-Feb-70	23,447	N/A	Sand, gravel	Maintenance	N/A
11	Federal	15-Feb-71	30,000	Suction	Sand, clay, silt	New	Upland
14	Federal	17-Jun-71	39,160	Suction	Sand, gravel	Maintenance	Open water
44	Federal	30-Jun-73	45,560	N/A	N/A	Maintenance	N/A
27	Federal	15-Sep-79	30,000	Mechanical	Sand	Maintenance	Upland
28	Federal	30-Jun-80	5,000	Mechanical	Sand, gravel	Maintenance	Upland
32	Federal	15-Mar-84	43,078	Suction	Sand, gravel	Maintenance	Riverine
36	Federal	16-Jul-90	496,008	Mechanical	Sand, gravel, rock	Improvement	Open water
41	Federal	15-Dec-91	20,083	Suction	Sand, gravel	Maintenance	Riverine
42	Federal	22-Apr-92	51,139	Mechanical	Rock, unclassified material	Improvement	Open water
3	NH State Port Authority	05-Jun-63	0	N/A	N/A	Unknown	Upland
25	New Hampshire Port Authority	30-Jun-77	4,743	Mechanical	Sand, gravel	Improvement	Upland
23	State of NH/Portsmouth Commercial Fish Pier	30-Jun-77	24,000	Combination	Sand, gravel	New	Upland
30	Portsmouth Commercial Fish Pier	30-Jun-82	4,000	Mechanical	Sand, gravel	Maintenance	Upland
40	Public Service of New Hampshire	30-Jun-91	13,000	Mechanical	Rock	Improvement	Upland

N/A: Information not available.

4. 1883 - Sen. Ex. Document No. 44, 48th Congress, 1st Session; Unfavorable preliminary examination and survey for dam construction near mouth of Great Bay.

5. 1884 - House Ex. Document No. 71, 48th Congress, 2nd Session; Unfavorable preliminary examination for improvement of Portsmouth Harbor.

6. 1899 - House Document No. 39, 56th Congress, 1st Session; Unfavorable preliminary examination.

7. 1900 - House Document No. 263, 56th Congress, 2nd Session; Preliminary examination and Survey; Favorable report to improve navigation into Navy Yard. Completed by the Navy.

8. 1909 - House Document No. 1086, 61th Congress, 3rd Session; Preliminary examination (Review of Reports); Unfavorable report for construction of lock and dam in Piscataqua River.

9. 1915 - House Document No. 1010, 64th Congress, 1st Session; Unfavorable preliminary examination of shoals and ledge in various areas.

10. 1952 - House Document No. 556, 82nd Congress, 2nd Session; Survey (Review of Reports); Favorable report recommending removal of ledge rock at certain points along the Federal channel.

11. 1962 - House Document No. 482, 87th Congress, 2nd Session; Survey (Review of Reports); Favorable report recommending widening of Federal channel at certain points.

12. 1965 - Small Navigation Project Detailed Project Report; Favorable recommendation for two six foot deep channels from Little Harbor to Leachs Island and Sagamore Creek.

13. 1984 - Feasibility Report For Navigation Improvement; Recommends widening of 35 foot deep turning basin, widening northern limit of channel adjacent to Badger's Island, and widening the southern limit of channel at Goat Island.

14. 1986 - Authorization from Water Resources Development Act of 1986 (33 U.S.C. 2201) for widening of 35 foot deep turning basin, widening northern limit of channel adjacent to Badger's Island, and widening the southern limit of channel at Goat Island.

State Dredging Projects

The New Hampshire Port Authority (NHPA) was formed in 1957 as part of a port revitalization project. Located on the Piscataqua River in southeastern New Hampshire, Portsmouth is the only deep water, ice-free port in the State of New Hampshire.

The NHPA handles scrap metal, containers, general cargo in palletized, neo-bulk, and break-bulk. The Port of New Hampshire also contributes to the operation of the Portsmouth Naval Shipyard, which is an important submarine

repair and overhaul facility. Another major activity within the Port is commercial fishing and lobstering. According to the Port of New Hampshire's 1992-1993 International Trade Directory, approximately 80 percent of the finfish and 40 percent of the lobsters landed within the state arrive through the Port of New Hampshire. Much of the fishing activity, excluding lobstering, that occurs within the Port area is accommodated at the State Fish Pier at Pierce Island. While a half dozen lobster boats on the Piscataqua River utilize the State Fish Pier, the majority of vessels land their catch at the private docks or at take out locations connected with the retail/wholesale outlets.

The New Hampshire Port Authority is currently planning for expansion of its facilities within Portsmouth Harbor. This expansion is to provide a full-service port facility capable of handling multiple vessels and cargoes. A 300 foot pier was constructed, then expanded another 300 feet in 1972. Today, the 600 foot pier accommodates vessels up to 700 feet long. The proposed expansion will allow the Port Authority to increase its ability to cost-effectively handle a wide variety of exports and imports which are not able to be accommodated either at the existing port facilities or at easily developable alternative sites in New Hampshire. The expansion, as proposed, will provide berthing space and increase the Port Authority's ability to meet the region's shipping needs.

In 1989 the NHPA prepared its first comprehensive Master Plan. Under this plan, the existing single-pier port is proposed to be expanded into a three-pier facility. This facility will provide for relocation of the existing scrap metal operation to the far end of the facility, north of the U.S. Route 1 Bypass. The existing pier will be returned to its original purpose as a general cargo pier with on-site warehousing capabilities. A new pier proposed for the South Yard Cove will be a multipurpose pier providing passenger ships, visiting tall ships, and naval vessels with berthing area, in addition to the current cruise vessel operation.

Prior State Investigations

1. 1980 - Site Evaluation and Design Study New Hampshire State Port Authority, Portsmouth, New Hampshire. Prepared for the New Hampshire Department of Public Works and Highways (Project No. 8304). C.E. Maguire, Inc., Waltham, Massachusetts (May, 1980).

2. 1982 - New Hampshire Long Range Dredged Material Management Study; New England Governor's Conference (August, 1982). Costello, Lomasney, & deNapoli.

3. 1986 - Portsmouth Port Development Study - Final Report; Prepared for the Office of State Planning, by Temple, Barker & Sloane, Inc., June 30, 1986.

4. 1989 - New Hampshire Port Authority Master Plan. Expand existing single pier port into a three pier facility. Prepared by Kimball Chase.

5. 1992 - Piscataqua River Dredging/Sediment Transport Program - Final Report; Celikkol, Swift and Ballestero, College of Engineering and Physical Sciences, University of New Hampshire.

A summary of dredging activities in Portsmouth Harbor/Piscataqua River is contained in Table 2. A more complete and detailed database of dredging information is shown in Appendix A.

Environmental Review

A brief review of material type, disposal areas and other environmental considerations such as water quality and biological resources is given in Appendix B.

4. RYE HARBOR

Rye Harbor is located about 5 miles south of Portsmouth Harbor and 13 miles north of the mouth of the Merrimack River. Roughly rectangular in shape, Rye Harbor is about 2000 feet long, 900 feet wide, and about 40 acres in area. (See Figure 4.) The harbor is serviced by two public piers at the head of the harbor and by yacht club moorings, and is used extensively by local and transient recreational and charter fishing boats.

Federal Dredging Projects

The Federal project was completed in 1962 and consists of:

- A 2300 foot long channel, 100-feet wide, extending from the ocean to the head of the harbor, immediately north of the state-built anchorage. The channel is 10 feet deep for its first 600 feet, then becomes 8-feet deep for 1700 feet, to the head of the harbor.

- An 8-foot deep anchorage, 5 acres in area, on the south side of the channel.

- A 6-foot deep anchorage, 5 acres in area, on the north side of the channel.

- The repair and restoration of two existing state-built breakwaters situated on each side of the harbor entrance. The north breakwater is 540 feet long, and the south breakwater is 530 feet long. The breakwaters were constructed in 1939.

The Federal project has been maintained only once since being constructed in 1962. This maintenance took place in 1990 in conjunction with maintenance of the State anchorage. These activities are detailed in Table 3.

Prior Federal Investigations

1. 1909 - House Document No. 301, 61st Congress, 2nd Session; Preliminary examination found dredging not economically justified.

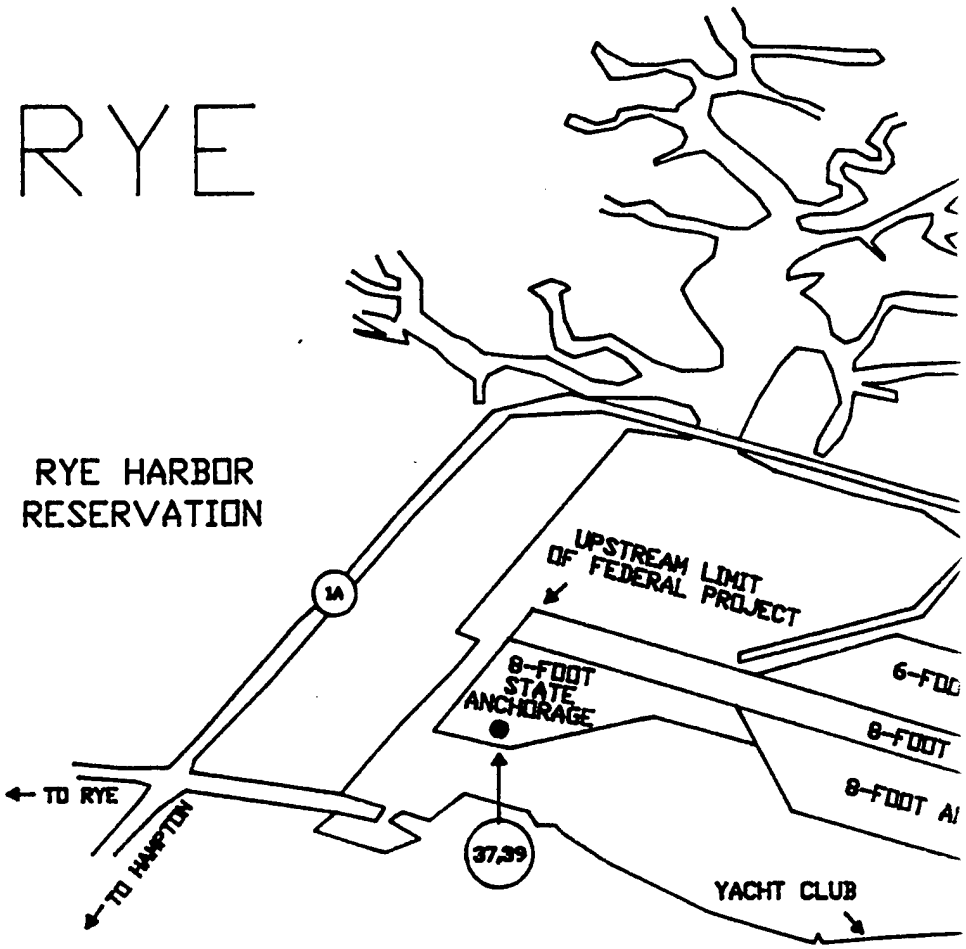
2. 1930 - Unpublished preliminary examination found dredging not economically justified.

3. 1956 - Favorable preliminary examination.

4. 1960 - House Document No. 439, 86th Congress, 2nd Session; Survey (Review of Reports); recommended Federal improvement of Rye Harbor.

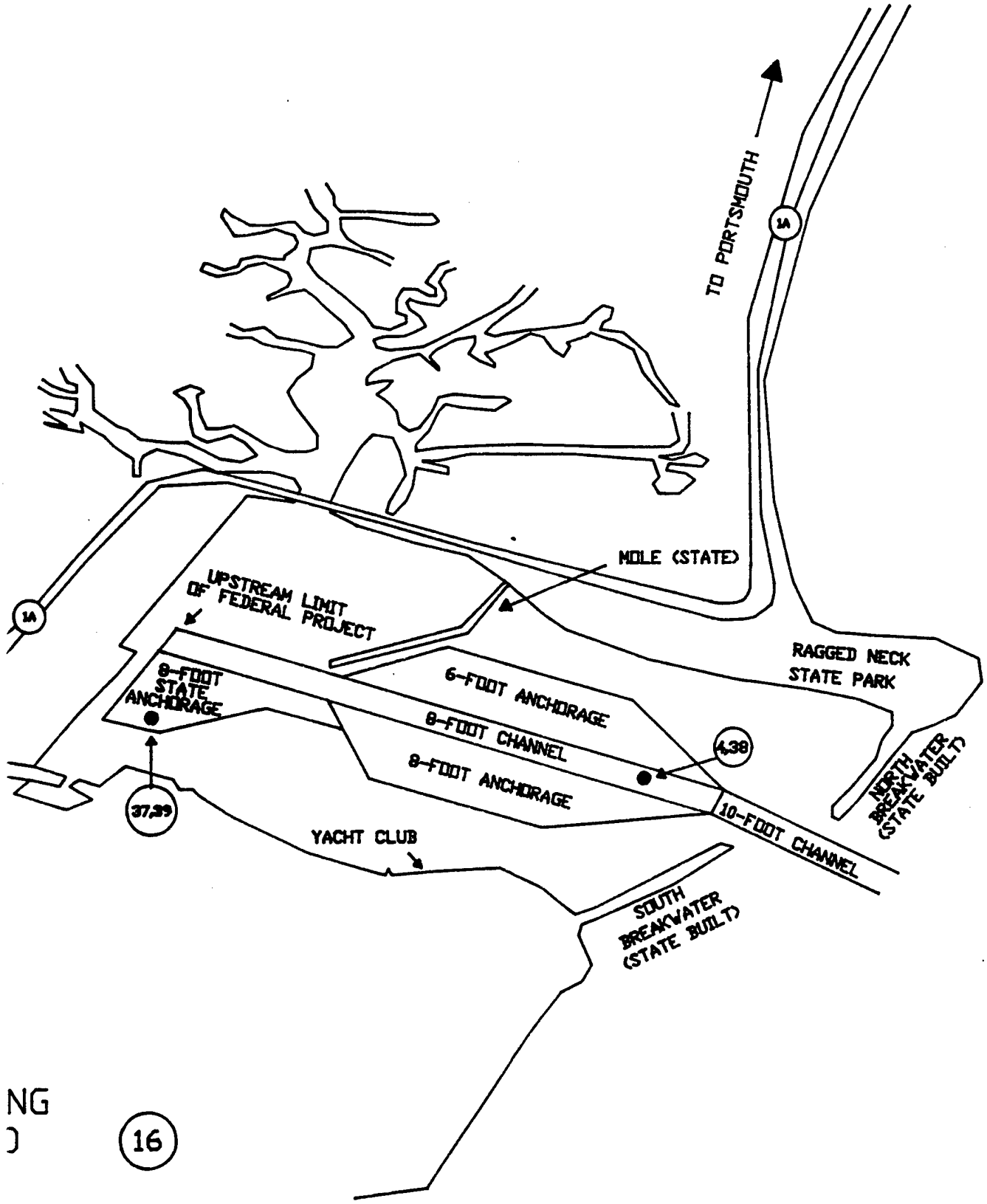
5. 1962 - Design Memorandum for authorized plan of improvement.

RYE



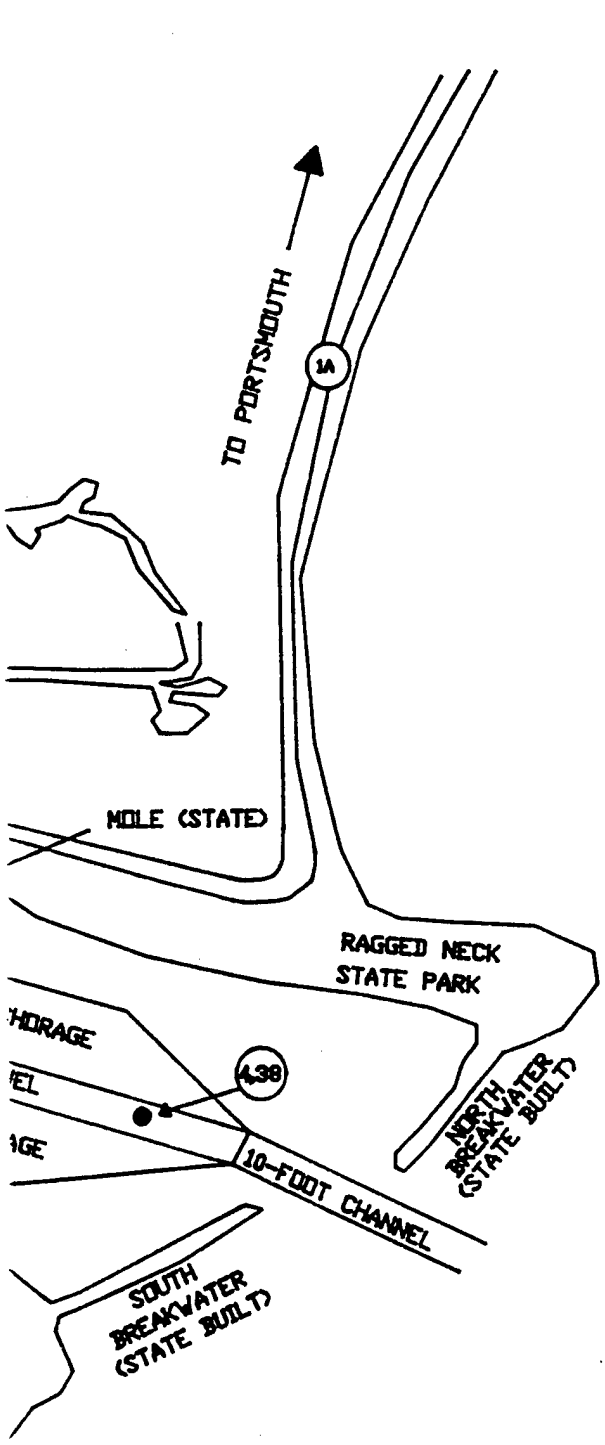
KEY

HISTORIC DREDGING
ACTIVITY RECORD
NUMBER (16)


TO PORTSMOUTH
1A
MOLE (STATE)
UPSTREAM LIMIT OF FEDERAL PROJECT
8-FOOT STATE ANCHORAGE
6-FOOT ANCHORAGE
8-FOOT CHANNEL
8-FOOT ANCHORAGE
10-FOOT CHANNEL
RAGGED NECK STATE PARK
NORTH BREAKWATER (STATE BUILT)
SOUTH BREAKWATER (STATE BUILT)
YACHT CLUB
4,38
37,39

NG
)

16



ATLANTIC

OCEAN

FIGURE 4

RYE HARBOR

NEW HAMPSHIRE

SCALE IN FEET

200 0 600

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MA

C3

Table 3

Rye Harbor
Dredging Activities

Record Number	Permittee	Date	Total Volume	Method Type	Material Type	Project Type	Disposal Type
4	Federal	30-Jun-62	138,400	N/A	N/A	New	Upland
38	Federal	20-Jun-90	68,623	Mechanical	Sandy silt, fine sand	Maintenance	Open water
37	NH Dept of Resources & Economic Development	16-Mar-90	600	Mechanical	Silty sand	Maintenance	Open water
39	NH Dept of Resources & Economic Development	20-Jun-90	3,248	Mechanical	Sandy silt, fine sand	Improvement	Open water

N/A: Information not available.

State Dredging Projects

In 1941, the State built an 8-foot deep anchorage, about 2.5 acres in area, at the head of the harbor. There are also two breakwaters at the entrance which were built by the State around 1939. The State anchorage has been maintained most recently in 1990 when maintenance dredging was performed for the Federal project.

A summary of dredging activities in Rye Harbor is contained in Table 3. A more complete and detailed database of dredging information is shown in Appendix A.

Environmental Review

A brief review of material type, disposal areas and other environmental considerations such as water quality and biological resources is given in Appendix B.

III. HISTORIC DREDGING ANALYSIS & FUTURE PROJECTIONS

A database of historical dredging activities has been compiled and is described in Appendix A. The future projections are based on historical trends in maintenance dredging identified in the database. A review of dredging activities within each of the harbors was accomplished and presented in the preceding section.

The information used to develop the database was derived from the following sources:

1) U.S. Army Corps of Engineers, New England Division dredging permit files and Annual Reports to the Chief of Engineers,

2) the New Hampshire Long Range Dredge Management Study, 1982, prepared for the New England Governor's Conference,

3) the Cape Arundel Disposal Site Needs Analysis (Draft), 1991, prepared for the Environmental Protection Agency, Region I,

and, 4) discussions with members of various state agencies, including the Office of State Planning, the New Hampshire Port Authority, the Department of Resources and Economic Development, and the Bureau of Public Works, Department of Transportation. Only incidental information obtained from discussions with various agencies was included in the historical database.

A review of sediment characteristics and environmental considerations at each of the harbors is contained in Appendix B. The following historical projections are based on past maintenance dredging of State and Federal projects. The State and Federal projects are listed in Tables 1-3 and in Appendix A. After compiling the data, a linear projection of historical maintenance dredging activities was used to obtain estimated volumes of dredged material to the year 2042. Due to the difficulty in determining future improvement dredging, it was not accounted for in the linear projections.

Potential Future Projects

Potential future dredging projects without a dredging history were also considered. At this time only three significant projects were identified which may take place within Little, Portsmouth, and Rye harbors within the near future. There were none identified for Hampton-Seabrook Harbor.

It has recently been determined that the Federal navigation project within Little Harbor may be dredged which could account for an estimated 270,000 cubic yards of dredged material. However, this is only an estimate, and a complete evaluation of the project's purpose and requirements are necessary to determine future dredging needs and project dimensions. There are also plans for the expansion of the New Hampshire Port Authority's facilities. This plan includes expanding the existing single-pier port into a three-pier facility and will require dredging about 160,000 cubic yards of material for upland disposal at the site.

Another potential future project is the construction of a new anchorage within Rye Harbor. The State of New Hampshire is also considering the construction of a new anchorage located north of the Federal channel and west of the existing mole. The area to be dredged would be approximately 4.7 acres and dredged to -6 feet Mean Low Water. It was estimated in 1986 that this would require the removal of approximately 60,000 cubic yards of material composed of fine sand and silt.

The planned New Hampshire Port Authority expansion within Portsmouth Harbor, the possible dredging of the Little Harbor Federal navigation project, and the proposed new anchorage at Rye Harbor are the only major dredging projects identified in the coming years without a historical record of dredging activities.

The "Cape Arundel Disposal Site Needs Analysis (Draft)" projects no other significant improvements at Little, Portsmouth, Rye, or Hampton-Seabrook harbors which will require the use of the Cape Arundel Disposal Site through at least the year 2010.

It is not certain what portion of the material dredged within the next 50 years will require ocean disposal. The Revised Procedural Guide For Designation Surveys of Ocean Dredged Material Disposal Sites (Department of The Army, Waterways Experimentation Station, Technical Report D-90-8, 1990) states "...No disposal option is categorically better than another, from an operational, economic, environmental, or social standpoint. Extreme variability and some uncertainty among these factors necessitates site-specific and often subjective evaluations of most dredging and disposal projects." The physical and chemical characteristics of the material, its compatibility with potential disposal sites, and review of alternative disposal options must first be determined. However, a gross estimation of dredged material volumes and material types can be made utilizing historic trends. For example, the material dredged from the Hampton-Seabrook Harbor entrance channel and anchorages have historically been disposed of nearshore to be used as beach nourishment. There is nothing to indicate that this practice will not continue for the next 50 years. Therefore, at least for the material dredged from Hampton-Seabrook Harbor and the entrance channel, an ocean disposal site is most likely not required. In the case of the New Hampshire Port Authority's proposed expansion of its facilities, the current plan and permit call for the material to be disposed at an upland site.

1. HAMPTON-SEABROOK HARBOR

Between 1955 and 1992, about 807,000 cubic yards (CY) of material has been dredged from the Hampton-Seabrook Harbor area. This includes maintenance, improvement, and initial construction of the State anchorages and Federal entrance channel which extends east of the Route 1A bridge. All of the dredged material was primarily sand.

The following is a breakdown of the historic maintenance dredging quantities based on project sponsor.

Sponsor	Volume (CY)	% of Total
Federal	240,300	32.7%
State	493,000	67.3%
	733,300	100.0%

Based on the historical dredging activities (excluding initial project construction and improvement work) at Hampton-Seabrook Harbor, a 50 year projection (1992 to 2042) is shown in Table 4. Dredged material from this harbor is primarily clean sand suitable for beach renourishment.

TABLE 4

HAMPTON-SEABROOK HARBOR

50 YEAR DREDGED MATERIAL VOLUME PROJECTION (1992-2042)

	Average Dredging Vol. (CY)	Frequency (per 50 Years)	Volume per 50 Years	Other Future Vol. (CY)	Total Volume (CY)	Annual Volume (CY)
Federal	20,000	2 years	500,000	0	500,000	10,000
State	80,000	6 years	640,000	0	640,000	12,800
Total					1,140,000	22,800

Note: The "Total Volume" is the "Dredging Volume" multiplied by the frequency over a 50 year period, plus "Other Future Volumes". "Other Future Volumes" is the volume of dredged material which has been identified from possible future projects.

Example: 20,000 CY x 25 times over a 50 year period (once every 2 years) + 0 (Other Future Volumes) = 500,000 CY

2. LITTLE HARBOR

There has been no maintenance dredging of the Federal project within Little Harbor since it was constructed. Although there are no specific plans for maintaining or improving the Federal project, there is local concern that it will require dredging in the near future. Recent correspondence with the New Hampshire Port Authority estimates about 270,000 cubic yards of clean fine sand will need to be removed to bring the project back to authorized dimensions. A copy of the correspondence letter is contained in Appendix D. Disposal options must be formulated based on the material's physical and chemical characteristics, and engineering and economic feasibility.

The "Cape Arundel Disposal Site Needs Analysis (Draft)" report indicates no future dredging plans for this area. Therefore, it appears that there will be no significant amount of dredged material originating from Little Harbor over the next 50 years other than possible future maintenance dredging of the Federal project as described above. There is no historical basis for making future projections based on maintenance dredging of the Federal project within Little Harbor since the project has not been maintained since completion in 1903. Therefore, the total projected amount of dredged material will be 270,000 cubic yards. Although not included in this historical projection of dredging activities, there has also been a significant amount of dredged material which originated from Wentworth-By-The Sea.

TABLE 5

LITTLE HARBOR

50 YEAR DREDGED MATERIAL VOLUME
PROJECTION (1992-2042)

	Average Dredging Vol.(CY)	Frequency (per 50 Years)	Volume per 50 Years	Other Future Vol.(CY)	Total Volume (CY)	Annual Volume (CY)
Federal	0	-----	0	270,000	270,000	5,400
State	0	-----	0	0	0	0
Total					270,000	5,400

Note: The "Total Volume" is the "Dredging Volume" multiplied by the frequency over a 50 year period, plus "Other Future Volumes". "Other Future Volumes" is the volume of dredged material which has been identified from possible future projects.

Example: 0 CY x 0 times over a 50 year period + 270,000 (Other Future Volumes) = 270,000 CY

3. PORTSMOUTH HARBOR/PISCATAQUA RIVER

There have been numerous dredging activities within the Portsmouth Harbor/Piscataqua River area, including Federal and State maintenance and improvement projects. It is estimated that about 1,523,200 cubic yards of material has been dredged from the Portsmouth Harbor, Piscataqua River, and Sagamore Creek area since 1957. Reliable records and information are not available prior to this date. The following is a breakdown of the historic dredged material quantities based on project sponsor.

Sponsor	Volume (CY)	% of Total
Federal	1,477,500	97.0%
State	45,700	3.0%
	1,523,200	100.0%

The type of material is broken down as follows:

Type	Volume (CY)	% of Total
Sand/Gravel/Silt	1,201,614	78.9%
Rock	213,785	14.0%
Other/Unknown	107,801	7.1%
	1,523,200	100.0%

A 50 year projection (1992 to 2042) of dredged material volumes based on the historical trends of dredging activities at Portsmouth Harbor/Piscataqua River is shown in Table 6. This projection does not include initial project construction or improvement work such as occurred during the mid-1960's when the Federal channel was extended to Newington and portions were widened or the more recent channel widening accomplished from 1989 to 1992. The volume of future dredged materials based on material type is shown in Table 7. These were derived from historical dredging activities within Portsmouth Harbor and the Piscataqua River.

The only new dredging project identified for the future is the New Hampshire Port Authority's pier facility expansion. At present, the Corps of Engineers has issued a permit for the dredging of about 160,000 cubic yards of fine silts and sands for upland disposal at the site. This has been included in the future projection of dredged material.

TABLE 6

PORTSMOUTH HARBOR/PISCATAQUA RIVER

50 YEAR DREDGED MATERIAL VOLUME
PROJECTION (1992-2042)

	Average Dredging Vol. (CY)	Frequency (per 50 Years)	Volume per 50 Years	Other Future Vol. (CY)	Total Volume (CY)	Annual Volume (CY)
Federal	29,500	3 years	472,000	0	472,000	9,440
State	4,000	20 years	8,000	160,000	168,000	3,360
Total					640,000	12,800

Note: The "Total Volume" is the "Dredging Volume" multiplied by the frequency over a 50 year period, plus "Other Future Volumes". "Other Future Volumes" is the volume of dredged material which has been identified from possible future projects.

Example: 29,500 CY x 16 times over a 50 year period (once every 3 years) + 0 (Other Future Volumes) = 472,000 CY

TABLE 7

PORTSMOUTH HARBOR/PISCATAQUA RIVER
FUTURE DREDGED MATERIAL TYPES & VOLUMES
(1992-2042)

	SAND/GRAVEL/SILT (CY)	UNKNOWN (CY)	TOTAL (CY)
Federal	368,000	104,000	472,000
State	168,000	0	168,000
Total	536,000	104,000	640,000

4. RYE HARBOR

Since completion of the Federal project in 1962, there has been about 72,500 CY of material dredged from the harbor due to maintenance dredging of the Federal channel and State anchorage in 1990. Virtually all of the dredged material originating from Rye Harbor has been sandy silt. Of the total volume of material dredged from Rye Harbor, approximately 98% was derived from the construction and maintenance of the Federal navigation project and 2% from the State anchorage. This harbor has been dredged only once since completion of the Federal project in 1962. A 50 year projection (1992 to 2042) of dredged material volumes based on the historical trends of dredging activities at Rye Harbor is shown in Table 8. A total of 132,400 CY of material can be expected to be dredged from Rye Harbor over the next 50 years. Maintenance of the Federal project will contribute 68,600 CY, maintenance of the State project will contribute 3,800 CY, and 60,000 CY would come from the proposed new State anchorage.

TABLE 8

RYE HARBOR

50 YEAR DREDGED MATERIAL VOLUME
PROJECTION (1992-2042)

	Average Dredging Vol. (CY)	Frequency (per 50 Years)	Volume per 50 Years	Other Future Vol. (CY)	Total Volume (CY)	Annual Volume (CY)
Federal	68,600	29 years	68,600	0	68,600	1,372
State	3,800	29 years	3,800	60,000	63,800	1,276
Total					132,400	2,648

Note: The "Total Volume" is the "Dredging Volume" multiplied by the frequency over a 50 year period, plus "Other Future Volumes". "Other Future Volumes" is the volume of dredged material which has been identified from possible future projects.

Example: 3,800 CY x 1 time over a 50 year period (once every 29 years)
+ 60,000 (Other Future Volumes) = 63,800 CY

5. SUMMARY OF FUTURE PROJECTIONS

The following is a summary of the total future dredged material volumes for the next 50 years based on historic dredging trends for each harbor:

Harbor	Volume (CY) (1992-2042)	Frequency Federal/State	Comments
Hampton-Seabrook Harbor	1,140,000	Fed. 2 yrs. State 6 yrs.	Historically used for beach renourishment of Hampton Beach.
Little Harbor	270,000	------	Possible maintenenace dredging of Federal navigation project.
Portsmouth Harbor /Piscataqua River	640,000	Fed. 3 yrs. State 20 yrs.	Upland, riverine, and open water disposal sites have historically been used. This estimate includes NHPA berth expansion.
Rye Harbor	132,400	Fed. 29 yrs. State 29 yrs.	Historically placed at Cape Arundel Disposal Site or at upland sites. This estm. includes State anchorage expansion.

IV. DREDGING AND DREDGED MATERIAL DISPOSAL PROCESS

The dredging and dredged material disposal process within New Hampshire and the State's coordination with the Corps of Engineers is discussed in this section as outlined below.

1. The Process for Establishing And Prioritizing New Hampshire's Dredging Needs,

2. Coordinating Dredging and Dredged Material Disposal Activities Between the Corps of Engineers and the State of New Hampshire.

1. The Process for Establishing And Prioritizing New Hampshire's Dredging Needs.

Based on discussions with members of various New Hampshire State agencies, there appears to be no formal policy of prioritizing dredging needs or activities within the State. However, the State has completed the New Hampshire Long Range Dredge Management Study to determine the scope of future dredging requirements and to recommend a dredging management strategy. This study was conducted in 1982 for the New England Governor's Conference by Costello, Lomasney, and deNapoli, Inc., of Manchester, New Hampshire, and formulated a dredging management strategy which included the following steps:

- Identification of Objectives: General objectives should include the enhancement of navigational safety, protection of the environment and maintenance and improvement of the economy of coastal areas.

- Setting Priorities for Future Dredge Projects: Priorities should be set for dredging projects on the basis of their relative importance to meeting the identified objectives. Existing harbor maintenance projects should be given first priority and should be scheduled and funded at regular intervals.

- Identification of Disposal Sheds and Designation of Public Disposal Sites: The New Hampshire Office of State Planning completed a study to determine alternatives to open water disposal sites for dredged material in New Hampshire. The method used in this report was adopted from the New England River Basins Commission and utilized a two phase process. The first phase involved preliminary screening to eliminate areas considered unacceptable for dredged material disposal. The second phase included a specific site analysis of those areas found to have some potential for disposal. As of 1982, only the screening phase had been conducted identifying potential upland disposal sites. No near-shore or open water sites were identified, primarily because of the potential environmental damage that could occur to valuable finfish, shellfish, and lobster

habitats. This preliminary screening used existing information to eliminate from contention areas considered unacceptable for dredged material disposal.

- o Development of Disposal Site Management Plan: A disposal site management plan has been outlined for open water and intertidal sites, and upland sites. The open water and intertidal plan is based on a plan for open water disposal management in Long Island Sound. The upland plan is based on guidelines established by the New Hampshire Bureau of Solid Waste Management.

- o Evaluate and Update the Dredge Management Plan: Regularly evaluate whether dredging management meets the objectives efficiently.

The New Hampshire Harbors Management Project conducted in 1981 by the Office of State Planning recommended establishing a State Dredge Management Committee. It was recommended that membership on this committee include the Port Authority, the Department of Resources and Economic Development, Public Works and Highways, Fish and Game, and the Office of State Planning. The purpose of this committee was to:

- o Inventory past dredging projects in the seacoast harbor channels including the quantity of dredged material, and the type and location of disposal sites;

- o Prepare a list of potential dredging projects over the next five years and the quantity of dredged or fill material to determine the extent of need;

- o Identify alternative dredged material disposal sites;

- o Identify alternative funding to get dredging done including the feasibility for State purchase of a surplus dredge, Corps of Engineers funding, bonding and user taxes in the case of dredging for recreational boating;

- o Set up a priority schedule and program for dredging as outlined by the Long Range Dredge Management Study conducted in 1982.

It appears that this Section 22 study effort satisfies some of the above tasks which would be assigned to a Dredge Management Committee. This includes an inventory of past dredging projects and projecting future volumes of dredged materials.

2. Coordinating Dredging and Dredged Material Disposal Activities Between the Corps of Engineers and the State.

This section has been divided into two parts. Part "a." describes the coordination between the Corps of Engineers and State of New Hampshire concerning the dredging and dredged material disposal process, and part "b." describes the State of New Hampshire's and Corps of Engineers' regulatory requirements.

a. Corps of Engineers & State of New Hampshire Coordination of Dredging & Dredged Material Disposal Process

Summary of Corps of Engineers Project Requirements

Various projects within New Hampshire have been constructed under Section 107 of the Rivers and Harbors Act. Section 107 provides authority to the Corps of Engineers to plan and construct certain navigation projects without specific authorization from Congress. Federal assistance under Section 107 is limited to construction and maintenance of general navigation features such as entrance channels and anchorages. The local sponsor of a Section 107 project must provide all land, easements, dredged material disposal areas, utility relocations, and all servicing facilities needed for the project. Other projects have been specifically authorized by Congress, such as the recent improvement dredging at Portsmouth Harbor.

The Corps of Engineers dredging activities can be divided into the two broad categories of improvement and maintenance dredging. Improvement dredging includes those Corps of Engineers programs that establish new navigation features in harbors where that feature does not presently exist. Maintenance dredging includes the survey and dredging of Congressionally authorized (improved) navigation features.

The responsibility for providing a dredged material disposal site varies for each of the existing projects. Letters of Assurance provided in Appendix E outline the responsibilities of the parties signing the agreements. However, in planning new navigation projects, the present policy is to require local interests to provide without cost to the United States all suitable areas required for initial and subsequent disposal of dredged material and all necessary retaining dikes, bulkheads and embankments therefor, or the costs of such retaining works.

Both types of Corps of Engineers projects, maintenance and improvement, require compliance with the following Acts:

National Environmental Policy Act (e.g. an Environmental Assessment or Environmental Impact Statement);

Endangered Species Act (e.g. a Section 7 consultation);

Evaluation criteria of Section 404 (b)1 of the Clean Water Act;

Section 10 of the Rivers and Harbors Act;

Coastal Zone Management Act of 1972, as amended;

and, Section 103 of the Marine Protection, Research and Sanctuaries Act.

Compliance with local and State regulations is generally the responsibility of the non-Federal sponsor. Many of the projects' original congressional authorizations require the non-Federal sponsor to also supply the disposal site. The Corps of Engineers provides maintenance dredging usually at Federal cost, however, all projects recently authorized for improvement now require a non-Federal cost-share. These provisions place the non-Federal sponsor in the forefront of guiding the project development.

Federal action is also required to obtain a Clean Water Act, Section 401 Water Quality Certification from the implementing State agency for those activities involving a discharge of dredged material in State waters. Any coastal activity by the Corps of Engineers must also be coordinated with the State's Coastal Zone Management program to obtain concurrence that the action is consistent with the policies of that program to the "maximum extent practicable."

After a Federal navigation project has been constructed, the Corps of Engineers remains in contact with the state, local communities, harbor masters, port authorities, pilots, and other officials concerned with the condition of the navigation features. When problems are anticipated or reported, the Corps of Engineers performs surveys to ascertain the actual conditions. The survey results combined with the requirements of the vessels using the project determine the need for dredging.

If dredging appears to be warranted, the Corps of Engineers performs sampling and testing to identify the physical and chemical characteristics of the material to be dredged. Based on these characteristics and the estimated volume of material to be dredged, the Corps of Engineers evaluates potential environmental impacts and coordinates with local entities to identify feasible dredged material disposal options. This process leads to developing a proposal for accomplishing the maintenance dredging. The Corps of Engineers ultimately applies to the State for Water Quality Certification and Coastal Zone Management Program Consistency concurrence.

The disposal alternative for dredged material originating from Civil Works projects maintained by the Corps of Engineers is defined as "the one which meets required environmental laws and regulations in the least costly manner consistent with sound engineering practices." Potential open water disposal sites which may eventually be identified by this study may or may not meet these requirements. Their identification does not obligate use by the Corps of Engineers unless the sites meet the above requirements and are consistent with Corps of Engineers dredging and dredged material disposal regulations and criteria, including the requirement to consider all feasible disposal alternatives.

The budgeting procedure associated with this work has usually been initiated prior to State approvals being issued. Maintenance dredging of Federal projects requires a planning period of at least three to four years in order to be able to program funding requirements two years prior to initiating work. It is essential that the work for which funds are requested be accomplished within the fiscal year that the funds are made available. Therefore, it is important to ascertain that the work as proposed is acceptable to the project sponsor and the State prior to the Corps of Engineers seeking funds.

Maintenance dredging projects are budgeted on an individual project basis. The overall objective for each fiscal year is to complete work on items included in the President's Budget Request, as modified and approved by Congress, within that fiscal year. Budget execution policy further requires that virtually all funds appropriated for a given year be used within that year.

Based on the foregoing criteria, the New England Division initiates budgeting procedures for projects which the New England Division believes can be accomplished within the target fiscal year. This means that questions concerning the method of dredging, determining dredged material disposal sites, coordinating the appropriate timing of the work to be accomplished, and other issues relative to the necessary regulatory approvals should be resolved prior to initiating the budgeting procedures.

State of New Hampshire's Requirements for Dredging and Dredged Material Disposal Coordination

Coordination of dredging and disposal projects in New Hampshire's tidal waters is accomplished primarily through the Office of State Planning and the Council on Resources and Development.

The formation of a mechanism to deal efficiently and effectively with State of New Hampshire and Corps of Engineers issues was initiated in 1988 by Colonel Rhen, Division Engineer. The Director of the Office of State Planning (OSP) serves as the Governor's designee as Overall Coordinator for the activities of the New England Division, Corps of Engineers. The purposes of this position were outlined by Colonel Rhen as:

1) To improve overall communication and coordination between the State of New Hampshire and the Corps of Engineers,

2) To arrange a means through which possible internal State/local disagreements concerning proposed Corps of Engineers activities could be resolved in a timely manner.

According to New Hampshire officials, there has been very little activity resulting from the initiation of this process, however, the Director of OSP remains available to serve as Overall Coordinator.

The State's Council on Resources and Development was established in 1963 and is organized under Resources Statutes Annotated (RSA) 162-C. This 10 member council includes the following agencies: Office of State Planning (chairman), Department of Resources and Economic Development, Department of Environmental Services, Department of Agriculture, Fish and Game Department, Department of Safety, Office of Emergency Management, Civil Defense, Division of Public Health Services, Department of Education, and the Department of Transportation.

The Council on Resources and Development responsibilities include: consulting upon common problems in environmental protection, natural resources, and growth management; consulting with any Federal or State agency concerning its work; and resolving differences in conflicts concerning development or resource management. The Council on Resources and Development makes recommendations to the Governor and to the General Court for solutions to problems investigated.

The Council on Resources and Development has served as a vehicle for dealing with Corps of Engineers dredging activities. In the role as Chairman of the council, and as the Overall Coordinator, the Director of OSP is ideally suited to deal with Corps of Engineers dredging activities. The Director of OSP also depends on the New Hampshire Coastal Program to provide support and assistance in fulfilling his duties.

b. Regulatory Requirements Summary

Summary of Corps Regulatory Requirements & Other Pertinent Legislation

This section provides information on the laws defining the regulatory authorities and responsibilities of the Corps of Engineers and other pertinent legislative acts. The Corps of Engineers has not historically experienced any regulatory procedural problems associated with State sponsored dredging activities such as maintenance dredging of State anchorages.

I. Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) authorizes the Corps to regulate certain structures or work in or affecting navigable waters of the United States.

II. Section 404 of the Clean Water Act (33 U.S.C. 1344). Section 301 of this Act authorizes the Corps of Engineers to regulate the discharge of dredged or fill material into waters of the United States that are within the baseline. The baseline represents the outer limit of state jurisdiction over its adjacent coastal waters, and in general, is located about three miles out from the coastline.

III. Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413) authorizes the Corps of Engineers to regulate the transportation of dredged material for the purpose of disposal in the ocean beyond the baseline.

IV. Section 401 of the Clean Water Act requires applicants to obtain a water quality certification or waiver from the state water pollution control agency to discharge dredged or fill materials at sites within the baseline. This agency is responsible for reviewing the effect on water quality standards.

V. Section 307(c) of the Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1431) requires applicants to obtain a certification or waiver that the dredging and disposal activity complies with the state's coastal zone management program for activities affecting a state's coastal zone.

The Corps of Engineers issues several types of permits to authorize activities in waters of the United States. The activity will fall under either a general permit or an individual permit. A complete guide for applying for a permit may be obtained from the Corps of Engineers, New England Division.

Nationwide General Permits are a series of general permits issued by the Corps of Engineers Washington office for minor projects in certain areas. All nationwide permits have special conditions which must be met in order for a project to qualify for nationwide permit status. Code of Federal Regulations, 33 CFR Part 330.5(a), contains a complete description of the nationwide permits and the criteria for each, including standard conditions.

Regional General Permits apply to certain minor activities authorized by the Corps of Engineers on a regional or statewide basis. Activities allowed by a regional permit may include maintenance dredging with upland disposal.

There appear to be no specific problems associated with State sponsored dredging activities (i.e., maintenance dredging of State anchorages, etc.) and the Corps of Engineers regulatory procedures.

Summary of New Hampshire Regulatory Requirements

This section provides information on the laws and authorities of the State of New Hampshire in regulating dredging and disposal of dredged material in its tidal waters.

I. RSA 482-A. Dredging and disposal of dredged materials in New Hampshire's tidal waters are regulated primarily through the authority of the New Hampshire Wetlands Board. Under RSA 482-A, the Wetlands Board must issue a permit for any private dredging or disposal activity. Municipalities and state agencies must obtain a permit prior to commencing dredging activities or operations. Current Corps of Engineers policy is to apply for state and local permits only where Federal sovereign immunity has been expressly and unambiguously waived.

Membership on the Wetlands Board assures broad involvement from various state agencies and private organizations. The 12 member board is represented as follows: Department of Environmental Services (Water Resources Division, Water Supply and Pollution Control Division, and Waste Management Division), Office of State Planning, Fish and Game Department, Department of Transportation, Department of Resources and Economic Development, Department of Safety, New Hampshire Association of Conservation Commissions, New Hampshire Association of Conservation Districts, New Hampshire Municipal Association, and the construction industry.

II. Section 401 Water Quality Certification. The Water Supply and Pollution Control Division, Department of Environmental Services, is the state agency designated to issue the Water Quality Certification required under the Federal Clean Water Act. Any disposal of dredged material subject to the Corps of Engineers 404(b) authority must obtain such certification prior to commencing work.

III. Section 307(c) Coastal Zone Consistency Certification. The Office of State Planning is the designated state agency for issuing the Coastal Zone Consistency Certification required under the Federal Coastal Zone management Act of 1972, as amended. Within the Office of State Planning, the New Hampshire Coastal Program administers the Coastal Consistency process.

The Consistency Certification is based on the federally approved coastal program. To obtain certification, a private dredging or dredged material disposal activity must meet the requirements of that approved program. The approved program requires that a private dredging or dredged material disposal activity must abide by the

requirements of the Wetlands Board (482-A) by obtaining a permit under that authority. It also requires that a private dredging activity must obtain a 401 Water Quality Certification before that activity can be found consistent with the New Hampshire Coastal Program. Federal agencies must submit their own certification that the Federal activity is consistent with the Federally approved Coastal Zone Management, to the maximum extent practicable. The New Hampshire Coastal Program then either concurs or not with this determination.

V. CONCLUSIONS

This report details past dredging activities and projects future dredging based on historic trends. Based on the dredging projections detailed in this report, information contained in the Cape Arundel Disposal Site (CADS) Needs Analysis (Draft), and the New Hampshire Long Range Dredge Management Study, the following conclusions can be made:

- Hampton-Seabrook Harbor:

  Dredging at this site within the next 50 years will likely produce an estimated 1,140,000 cubic yards of dredged material primarily composed of sand. Historically this material has been used as beach nourishment, with some open water disposal.

- Little Harbor:

  It is estimated that about 270,000 cubic yards of sandy material would have to be removed from the existing Federal navigation project in order to restore it to authorized dimensions and maintain it over the next 50 years. However, this is only an estimate, and a complete evaluation of the project's purpose and requirements are necessary to determine future dredging needs and project dimensions.

- Portsmouth Harbor/Piscataqua River

  About 640,000 cubic yards of sand, gravel and other material will require removal within the next 50 years from this harbor.

- Rye Harbor:

  It is estimated that dredging activities in the next 50 years at this harbor will produce about 132,400 cubic yards of sandy silt material.

- Further investigations and evaluations of dredged material disposal alternatives for various dredged material types are necessary to determine alternative disposal options or to designate an open water disposal site or sites for New Hampshire's harbors. This evaluation of alternatives should be included in a comprehensive dredged material management strategy which may incorporate open water disposal.

This report reflects the portions of the New Hampshire Dredged Material Management study which have been completed to date and is the first step towards identifying an open water site, if required. Identifying and evaluating the various dredged material disposal options available for the material found in each harbor must still be accomplished to assess New Hampshire's needs for an open water disposal site or sites.

VI. ACKNOWLEDGMENTS

This report was developed and prepared by John Kedzierski of the Basin Management Division, Long Range Planning Branch with assistance provided by Jay Mackay of the Impact Analysis Division, Environmental Resources Branch. The report was prepared under the supervision and management of the following New England Division personnel:

Colonel Brink P. Miller, Division Engineer
Joseph L. Ignazio, Director of Planning
John C. Craig, Chief, Basin Management Division
John R. Kennelly, Chief, Long Range Planning Branch

APPENDIX A

DATABASE OF HISTORICAL DREDGING ACTIVITIES

DATABASE FIELD DESCRIPTIONS

The following is a brief description of some of the datafields associated with the attached database of dredging activities.

Note: N/A means Not Available

1. Record #: Number of record within the database.

2. Permit #: Army Corps of Engineers permit number issued for a particular dredging activity. If no permit number was found, or the information was not obtained from the Corps of Engineers permits files, then a zero is entered into this field. Federal projects were given a permit number solely for database consistency. The permit numbers for the Federal projects are based on the year the dredging took place. (e.g., dredging within Hampton Harbor in 1984 would be "841001", dredging within Portsmouth Harbor would be "841002", etc.) Note that the third digit of all permit numbers of Federal projects is a "1" to distinguish it from other projects.

3. Permittee: Agency conducting or accomplishing the dredging activity.

4. Date: Date the Corps permit was issued (not necessarily the date the dredging was accomplished) or the actual date of dredging, if known. If only the year the dredging took place was known, an arbitrary date of 6/30/?? was used for database input consistency.

5. Waterway: Harbor or waterway where dredging activity has been performed.

6. Volume & Volume2:
   These refer to the different volumes of various dredged material types.

   EXAMPLE: 50,000 cubic yards of material, of which 20,000 was sand and 30,000 was silt, was hydraulically dredged and disposed of in open water.

VOLUME 1	VOLUME 2
20,000	30,000

7. Totalvol:

Summation of all volumes of material removed during this particular dredging activity.

8. Method Type:

The following definition was used for categorizing the method of dredging:

Suction - includes hoppers, hydraulic pipelines, and sidecasters.

Mechanical - includes dippers, clamshells, and buckets.

Combination - a combination of suction and mechanical dredging methods. This also includes cutterheads.

From Engineering Manual EM 1110-2-5025, "Dredging and Dredged Material Disposal", Department of the Army, Corps of Engineers. (25 March 1983)

9. Disposal & Disposal2:

Dredged material disposal location corresponding to the volume and material type for that particular dredging activity.

10. Disposal Type:

A summary of the disposal methods for each of the material type(s) identified. The disposal type description was obtained from the New Hampshire Long Range Dredge Management Study. The three commonly used methods of disposal are: Upland, Nearshore, and Open Water.

11. Material & Material2:

Referenced the same as "Volume 1..", etc.
For the above example:

MATERIAL 1	MATERIAL 2
sand	silt

NOTE: N/A means no material type was identified.

12. Material Type:

This is a summary of the types of material given in the "Material" fields. For the above example, Material Type would be "Sand, silt".

13. Purpose:

Text field briefly describing the purpose of a particular dredging activity.

14. Project Type:

Projects were categorized as best as possible into the following groups:

M: Maintenance - Maintaining an existing project depth.
I: Improvement - Deepening or widening existing anchorages or channels.
N: New Work - New marina or anchorage construction.
U: Unknown - Unable to determine the type of work accomplished.

15. Contractor:

The contractor performing the dredging, if known. N/A means the name of the contractor was not available.

16. Cost:

The cost of the dredging activity in dollars. These costs are in dollars for the year the dredging took place.

17. Project Proponent:

F: Federal; S: State

Record Number	Permit Number	Permittee	Date	V
1	550141	State of New Hampshire	23-Jun-55	Hampton Harbor
5	600074	State of New Hampshire	30-May-65	Hampton Harbor
16	730247	State of New Hampshire	14-Aug-73	Hampton Harbor
20	760248	NH Dept of Resources & Economic Development	11-May-76	Hampton Harbor
21	760442	Public Service Company of New Hampshire	03-Sep-76	Hampton Harbor
24	0	Hampton Commercial Fish Pier	30-Jun-77	Hampton Harbor
26	790044	NH Dept of Resources & Economic Development	08-Feb-79	Hampton Harbor
34	0	NH Dept of Transportation	30-May-87	Hampton Harbor
43	912019	NH Dept of Resources & Economic Development	03-Aug-92	Hampton Harbor
7	651001	Federal	30-Jun-65	Hampton Harbor -
8	651002	Federal	15-Nov-65	Hampton Harbor -
10	681001	Federal	15-Apr-68	Hampton Harbor -
13	711001	Federal	15-Jun-71	Hampton Harbor -
15	731001	Federal	15-Apr-73	Hampton Harbor -
17	741001	Federal	22-Apr-74	Hampton Harbor -
18	751001	Federal	05-May-75	Hampton Harbor -
19	761001	Federal	29-Apr-76	Hampton Harbor -
22	771001	Federal	02-May-77	Hampton Harbor -
29	811001	Federal	15-Jul-81	Hampton Harbor -
31	821001	Federal	30-Jun-82	Hampton Harbor -
33	841001	Federal	15-Jul-84	Hampton Harbor -
35	871001	Federal	15-Sep-87	Hampton Harbor -
2	571001	Federal	30-Jun-57	Portsmouth Harbo
3	630125	NH State Port Authority	05-Jun-63	Portsmouth Harbo
6	651001	Federal	30-Jun-65	Portsmouth Harbo
9	661001	Federal	15-Jan-66	Portsmouth Harbo
12	701001	Federal	15-Feb-70	Portsmouth Harbo
14	711003	Federal	17-Jun-71	Portsmouth Harbo
44	731001	Federal	30-Jun-73	Portsmouth Harbo
25	0	New Hampshire Port Authority	30-Jun-77	Portsmouth Harbo
23	0	State of NH/Portsmouth Commercial Fish Pier	30-Jun-77	Portsmouth Harbo
27	791001	Federal	15-Sep-79	Portsmouth Harbo
28	801001	Federal	30-Jun-80	Portsmouth Harbo
30	0	Portsmouth Commercial Fish Pier	30-Jun-82	Portsmouth Harbo
32	841002	Federal	15-Mar-84	Portsmouth Harbo
36	901002	Federal	16-Jul-90	Portsmouth Harbo
40	900866	Public Service of New Hampshire	30-Jun-91	Portsmouth Harbo
41	911001	Federal	15-Dec-91	Portsmouth Harbo
42	921001	Federal	22-Apr-92	Portsmouth Harbo
11	711002	Federal	15-Feb-71	Portsmouth Harbo
4	621001	Federal	30-Jun-62	Rye Harbor
37	900588	NH Dept of Resources & Economic Development	16-Mar-90	Rye Harbor
39	850352	NH Dept of Resources & Economic Development	20-Jun-90	Rye Harbor
38	901001	Federal	20-Jun-90	Rye Harbor

(1)

Table A-1

Historical Dredging Activities

Date	Waterway	Volume	Volume2	Total Volume	Disposal Method
23-Jun-55	Hampton Harbor	109,000		109,000	N/A
30-May-65	Hampton Harbor	110,000		110,000	N/A
14-Aug-73	Hampton Harbor	58,600		58,600	Hydraulic
11-May-76	Hampton Harbor	5,000		5,000	N/A
03-Sep-76	Hampton Harbor	30,000		30,000	Hydraulic
30-Jun-77	Hampton Harbor	9,000		9,000	Hydraulic
08-Feb-79	Hampton Harbor	51,310	25,000	76,310	Hydraulic
30-May-87	Hampton Harbor	59,135		59,135	Hydraulic
03-Aug-92	Hampton Harbor	80,000		80,000	Hydraulic
30-Jun-65	Hampton Harbor - Entrance Channel	29,400		29,400	Clamshell
15-Nov-65	Hampton Harbor - Entrance Channel	30,934		30,934	N/A
15-Apr-68	Hampton Harbor - Entrance Channel	17,400		17,400	Clamshell
15-Jun-71	Hampton Harbor - Entrance Channel	15,530		15,530	Clamshell
15-Apr-73	Hampton Harbor - Entrance Channel	15,070		15,070	Sidecast
22-Apr-74	Hampton Harbor - Entrance Channel	17,430		17,430	Sidecast
05-May-75	Hampton Harbor - Entrance Channel	21,070		21,070	Sidecast
29-Apr-76	Hampton Harbor - Entrance Channel	14,065		14,065	Sidecast
02-May-77	Hampton Harbor - Entrance Channel	7,400		7,400	Sidecast
15-Jul-81	Hampton Harbor - Entrance Channel	23,800		23,800	Sidecast
30-Jun-82	Hampton Harbor - Entrance Channel	26,200		26,200	Mechanical
15-Jul-84	Hampton Harbor - Entrance Channel	27,900		27,900	Hydraulic
15-Sep-87	Hampton Harbor - Entrance Channel	23,468		23,468	Hydraulic
30-Jun-57	Portsmouth Harbor/Piscataqua River	31,684		31,684	N/A
05-Jun-63	Portsmouth Harbor/Piscataqua River	0		0	N/A
30-Jun-65	Portsmouth Harbor/Piscataqua River	37,200	416,000	453,200	Dipper
15-Jan-66	Portsmouth Harbor/Piscataqua River	76,867	132,231	209,098	Dipper
15-Feb-70	Portsmouth Harbor/Piscataqua River	23,447		23,447	N/A
17-Jun-71	Portsmouth Harbor/Piscataqua River	39,160		39,160	Hopper
30-Jun-73	Portsmouth Harbor/Piscataqua River	45,560		45,560	N/A
30-Jun-77	Portsmouth Harbor/Piscataqua River	4,743		4,743	Clamshell
30-Jun-77	Portsmouth Harbor/Piscataqua River	24,000		24,000	Hydraulic/Clamshell
15-Sep-79	Portsmouth Harbor/Piscataqua River	30,000		30,000	Mechanical
30-Jun-80	Portsmouth Harbor/Piscataqua River	5,000		5,000	Mechanical
30-Jun-82	Portsmouth Harbor/Piscataqua River	4,000		4,000	Clamshell
15-Mar-84	Portsmouth Harbor/Piscataqua River	43,078		43,078	Hopper
16-Jul-90	Portsmouth Harbor/Piscataqua River	429,872	66,136	496,008	Clamshell
30-Jun-91	Portsmouth Harbor/Piscataqua River	13,000		13,000	Clamshell
15-Dec-91	Portsmouth Harbor/Piscataqua River	20,083		20,083	Hopper
22-Apr-92	Portsmouth Harbor/Piscataqua River	20,582	30,557	51,139	Mechanical
15-Feb-71	Portsmouth Harbor/Sagamore Creek	30,000		30,000	Hydraulic
30-Jun-62	Rye Harbor	138,400		138,400	N/A
16-Mar-90	Rye Harbor	600		600	Clamshell
20-Jun-90	Rye Harbor	3,248		3,248	Clamshell
20-Jun-90	Rye Harbor	68,623		68,623	Clamshell

vities

/ay	Volume	Volume2	Total Volume	Disposal Method	Disposal Method Type
	109,000		109,000	N/A	N/A
	110,000		110,000	N/A	N/A
	58,600		58,600	Hydraulic	Suction
	5,000		5,000	N/A	N/A
	30,000		30,000	Hydraulic	Suction
	9,000		9,000	Hydraulic	Suction
	51,310	25,000	76,310	Hydraulic	Suction
	59,135		59,135	Hydraulic	Suction
	80,000		80,000	Hydraulic	Suction
.nce Channel	29,400		29,400	Clamshell	Mechanical
.nce Channel	30,934		30,934	N/A	N/A
nce Channel	17,400		17,400	Clamshell	Mechanical
nce Channel	15,530		15,530	Clamshell	Mechanical
nce Channel	15,070		15,070	Sidecast	Suction
nce Channel	17,430		17,430	Sidecast	Suction
nce Channel	21,070		21,070	Sidecast	Suction
nce Channel	14,065		14,065	Sidecast	Suction
nce Channel	7,400		7,400	Sidecast	Suction
nce Channel	23,800		23,800	Sidecast	Suction
nce Channel	26,200		26,200	Mechanical	Mechanical
nce Channel	27,900		27,900	Hydraulic	Hydraulic
nce Channel	23,468		23,468	Hydraulic	Hydraulic
taqua River	31,684		31,684	N/A	N/A
taqua River	0		0	N/A	N/A
taqua River	37,200	416,000	453,200	Dipper	Mechanical
taqua River	76,867	132,231	209,098	Dipper	Mechanical
taqua River	23,447		23,447	N/A	N/A
taqua River	39,160		39,160	Hopper	Suction
taqua River	45,560		45,560	N/A	N/A
taqua River	4,743		4,743	Clamshell	Mechanical
taqua River	24,000		24,000	Hydraulic/Clamshell	Combination
taqua River	30,000		30,000	Mechanical	Mechanical
taqua River	5,000		5,000	Mechanical	Mechanical
taqua River	4,000		4,000	Clamshell	Mechanical
taqua River	43,078		43,078	Hopper	Suction
taqua River	429,872	66,136	496,008	Clamshell	Mechanical
taqua River	13,000		13,000	Clamshell	Mechanical
taqua River	20,083		20,083	Hopper	Suction
taqua River	20,582	30,557	51,139	Mechanical	Mechanical
nore Creek	30,000		30,000	Hydraulic	Suction
	138,400		138,400	N/A	N/A
	600		600	Clamshell	Mechanical
	3,248		3,248	Clamshell	Mechanical
	68,623		68,623	Clamshell	Mechanical

3

Record Number	Disposal Site	Disposal Site 2
1	Beach – Hampton Beach renourishment.	
5	Beach – Hampton Beach renourishment.	
16	Upland & nearshore.	
20	Upland	
21	Nearshore, sheet pile cells offshore.	
24	Upland – behind bulkhead	
26	Beach – behind halftide jetty.	Upland – for future beach nourishment.
34	Beach – Hampton beach renourishment.	
43	Beach – Hampton Beach renourishment.	
7	Open water	
8	Nearshore, off Hampton Beach	
10	Open water, 10 miles out.	
13	Open water, 10 miles out @ Great Boars Head.	
15	Open water – adjacent to channel.	
17	Open water – adjacent to channel.	
18	Open water – adjacent to channel.	
19	Open water – adjacent to channel.	
22	Open water – adjacent to channel.	
29	Open water – adjacent to channel.	
31	Open water – off Seabrook Beach.	
33	Behind south jetty for beach renourishment.	
35	Open water – off north end of Hampton Beach.	
2	N/A	
3	Upland	
6	N/A	
9	N/A	
12	N/A	
14	Open water – Isle of Shoals	
44	N/A	
25	Upland – adjacent to site.	
23	Upland – Parking area/beach/bulkhead.	
27	Upland (fuel storage facility)	
28	Upland (fuel storage facility)	
30	Upland – adjacent to site.	
32	Riverine	
36	Cape Arundel Disposal Site	
40	Upland – on site behind earth berm/silt fence.	
41	Disposal in deep area of river.	
42	Cape Arundel Disposal Site	Cape Arundel Disposal Site
11	Abondoned quarry, Wentworth Rd., Rye, NH	
4	Upland – across Rt. 1A from the harbor.	
37	Cape Arundel Disposal Site	
39	Cape Arundel Disposal Site	
38	Cape Arundel Disposal Site	

Table A-1 (cont.)

Historical Dredging Activities

Disposal Site 2	Disposal Site Type	Material	Material 2
	Upland	Sand	
	Upland	Sand	
	Upland/nearshore	Sand	
	Upland	N/A	
	Nearshore	Sand	
	Upland	Sand	
Upland – for future beach nourishment.	Upland	Sand	Sand
	Upland	Sand	
	Upland	Sand	
	Open water	Sand	
	Nearshore	Sand	
	Open water	Sand	
ead.	Open water	Sand	
	Open water	Sand	
	Open water	Sand	
	Open water	Sand	
	Open water	Sand	
	Open water	Sand	
	Open water	Sand	
	Open water	Sand	
	Upland	Sand	
ch.	Open water	Sand	
	N/A	N/A	
	Upland	N/A	
	N/A	Rock	Ordinary materia
	N/A	Rock	Ordinary materia
	N/A	Sand, gravel	
	Open water	Sand, gravel	
	N/A	N/A	
	Upland	Sand, gravel	
	Upland	Sand, gravel	
	Upland	Sand	
	Upland	Sand, gravel	
	Upland	Sand, gravel	
	Riverine	Sand, gravel	
	Open water	Sand, gravel	Rock
e.	Upland	Rock	
	Riverine	Sand, gravel	
Cape Arundel Disposal Site	Open water	Rock	Unclassified mat
	Upland	Sand, clay, silt	
	Upland	N/A	
	Open water	Silty sand	
	Open water	Sandy silt, fine sand	
	Open water	Sandy silt, fine sand	

(cont.)

ing Activities

Disposal Site Type	Material	Material 2	Material Type
Upland	Sand		Sand
Upland	Sand		Sand
Upland/nearshore	Sand		Sand
Upland	N/A		N/A
Nearshore	Sand		Sand
Upland	Sand		Sand
Upland	Sand	Sand	Sand
Upland	Sand		Sand
Upland	Sand		Sand
Open water	Sand		Sand
Nearshore	Sand		Sand
Open water	Sand		Sand
Open water	Sand		Sand
Open water	Sand		Sand
Open water	Sand		Sand
Open water	Sand		Sand
Open water	Sand		Sand
Open water	Sand		Sand
Open water	Sand		Sand
Upland	Sand		Sand
Open water	Sand		Sand
N/A	N/A		N/A
Upland	N/A		N/A
N/A	Rock	Ordinary material (sand)	Rock, Ordinary material
N/A	Rock	Ordinary material (sand)	Rock, Ordinary material
N/A	Sand, gravel		Sand, gravel
Open water	Sand, gravel		Sand, gravel
N/A	N/A		N/A
Upland	Sand, gravel		Sand, gravel
Upland	Sand, gravel		Sand, gravel
Upland	Sand		Sand
Upland	Sand, gravel		Sand, gravel
Upland	Sand, gravel		Sand, gravel
Riverine	Sand, gravel		Sand, gravel
Open water	Sand, gravel	Rock	Sand, gravel, rock
Upland	Rock		Rock
Riverine	Sand, gravel		Sand, gravel
Open water	Rock	Unclassified material	Rock, unclassified material
Upland	Sand, clay, silt		Sand, clay, silt
Upland	N/A		N/A
Open water	Silty sand		Silty sand
Open water	Sandy silt, fine sand		Sandy silt, fine sand
Open water	Sandy silt, fine sand		Sandy silt, fine sand

Table A–1 (cont.)

Historical Dredging Activities

Record Number	Purpose	F
1	Maintenance dredging/beach nourishment.	Main
5	Maintenance dredging/beach nourishment.	Main
16	Maintenance dredging(22 acres); NH Project No. 8230	Main
20	Bulkhead construction.	Impr
21	Bulkhead, offshore loading facility construction.	New
24	Commercial Fish Pier; NH Project No. 8262–C	Impr
26	Maintenance dredging.	Main
34	NH Project No. 98178–P; Some info. from EPA CADS survey.	Main
43	Maintenance dredging/beach nourishment.	Main
7	Project construction.	New
8	Maintenance dredging.	Main
10	Maintenance dredging.	Main
13	Maintenance dredging.	Main
15	Maintenance dredging.	Main
17	Maintenance dredging.	Main
18	Maintenance dredging.	Main
19	Maintenance dredging.	Main
22	Maintenance dredging.	Main
29	Maintenance dredging.	Main
31	Maintenance dredging.	Main
33	Maintenance dredging.	Main
35	Maintenance dredging.	Main
2	New work.	New
3	N/A	Unkn
6	Navigation improvement widening of channel and extending channel to Newington.	Impr
9	Navigation improvement widening of channel and extending to Newington.	Impr
12	Shoal removal in 35–foot channel.	Main
14	Maintenance dredging at Simplex of 35–foot channel.	Main
44	Maintenance dredging.	Main
25	Port Authority expansion;NH Project No. 8268–B (EPA CADS rpt. says "hydraulic")	Impr
23	Construct a commercial fish pier. NH Project No. 8267–B (EPA CADS rpt.)	New
27	Maintenance dredging of 35–foot turning basin near Simplex.	Main
28	Maintenance dredging of minor shoal areas within main channel.	Main
30	Maintain commercial fish pier. NH Project No. 8605	Main
32	Maintenance dredging.	Main
36	Widening channel btwn. vertical lift bridges near Badgers Island (Area 1)	Impro
40	This permit is pending. Renovate existing wharf at Schiller Station.	Impro
41	Maint. dredging in vicinity of Simplex facility.	Main
42	Improvement work widening channel adjacent to Goat Island. (Area 3)	Impro
11	Six foot deep channel serving Sagamore Creek – Backchannels (Section 107)	New
4	Project construction.	New
37	Maintenance dredging.	Main
39	Improvement dredging and expansion of State anchorage.	Impro
38	Maintenance dredging of Federal channel.	Main

B

Table A-1 (cont.)

Historical Dredging Activities

	Project Type	Contractor	Cost
	Maintenance	N/A	$0
	Maintenance	N/A	$0
	Maintenance	N/A	$114,658
	Improvement	N/A	$0
	New	Sutton Corp.	$60,000
	Improvement	N/A	$53,250
	Maintenance	Hydrodredge Corp.	$280,194
ey.	Maintenance	N/A	$393,083
	Maintenance	N/A	$0
	New	Am. Perini Corporation	$0
	Maintenance	N/A	$46,831
	Maintenance	Perini Corporation	$81,832
	Maintenance	Hydro-Dredge Perini	$134,964
	Maintenance	US Government Fry	$45,000
	Maintenance	US Government Fry	$62,000
	Maintenance	US Government	$0
	Maintenance	US Government Fry	$74,590
	Maintenance	US Government Fry	$89,900
	Maintenance	Shoals Corp.	$174,600
	Maintenance	N/A	$160,400
	Maintenance	Hydro	$243,810
	Maintenance	Hydro-Dredge	$280,897
	New	Contractor	$1,111,159
	Unknown	N/A	$0
; channel to Newington.	Improvement	N/A	$2,136,766
; to Newington.	Improvement	N/A	$1,306,866
	Maintenance	N/A	$19,381
	Maintenance	Government dredge "COMBER"	$135,162
	Maintenance	Government dredge.	$0
)S rpt. says "hydraulic")	Improvement	Perini Corp.	$133,751
EPA CADS rpt.)	New	Cianbro Corp.	$116,200
x.	Maintenance	Hydrodredge Corp.	$309,435
innel.	Maintenance	N/A	$90,000
	Maintenance	Shoals Corp.	$60,000
	Maintenance	Governement dredge "MCFARLAND"	$837,332
land (Area 1)	Improvement	Great Lakes Dredging & Dock Co.	$13,349,084
Station.	Improvement	N/A	$0
	Maintenance	Great Lakes Dredging & Dock Co.	$115,860
d. (Area 3)	Improvement	R. Zoppo	$2,790,051
nels (Section 107)	New	Hydro-Dredge	$0
	New	N/A	$86,863
	Maintenance	N/A	$0
	Improvement	Moores Neron, Inc.	$38,976
	Maintenance	Moores Neron, Inc.	$354,400

	Contractor	Cost
ıce	N/A	$0
ıce	N/A	$0
ıce	N/A	$114,658
ent	N/A	$0
	Sutton Corp.	$60,000
ent	N/A	$53,250
ıce	Hydrodredge Corp.	$280,194
ıce	N/A	$393,083
ıce	N/A	$0
	Am. Perini Corporation	$0
ıce	N/A	$46,831
ıce	Perini Corporation	$81,832
ıce	Hydro-Dredge Perini	$134,964
ıce	US Government Fry	$45,000
ıce	US Government Fry	$62,000
.ce	US Government	$0
.ce	US Government Fry	$74,590
ce	US Government Fry	$89,900
ıce	Shoals Corp.	$174,600
ıce	N/A	$160,400
ıce	Hydro	$243,810
.ce	Hydro-Dredge	$280,897
	Contractor	$1,111,159
	N/A	$0
ent	N/A	$2,136,766
ent	N/A	$1,306,866
ce	N/A	$19,381
ce	Government dredge "COMBER"	$135,162
ce	Government dredge.	$0
ent	Perini Corp.	$133,751
	Cianbro Corp.	$116,200
ce	Hydrodredge Corp.	$309,435
ce	N/A	$90,000
ce	Shoals Corp.	$60,000
ce	Governement dredge "MCFARLAND"	$837,332
ent	Great Lakes Dredging & Dock Co.	$13,349,084
ent	N/A	$0
ce	Great Lakes Dredging & Dock Co.	$115,860
ent	R. Zoppo	$2,790,051
	Hydro-Dredge	$0
	N/A	$86,863
ce	N/A	$0
ent	Moores Neron, Inc.	$38,976
ce	Moores Neron, Inc.	$354,400

B

APPENDIX B

ENVIRONMENTAL REVIEW OF SUBJECT HARBORS

Type of Material

Hampton Harbor material is predominantly clean sand and gravel with less than 1% silt except along the extensive mud flats adjacent to the tidal marshes in the inner harbor area. Given the coarse grained nature of the sediments which have been dredged within the harbor channel areas, chemical and biological testing of this material has not been necessary. There is no historical evidence of industrial spills or contaminants within these areas. As a result, it is concluded that most if not all of the material is suitable for ocean disposal or for the beneficial uses of beach nourishment and/or nearshore disposal. These sediments have been used extensively for the beneficial use of beach nourishment along the Hampton shoreline.

Disposal Areas

Areas historically utilized as disposal areas include:

1. Nearshore (beach nourishment) just south of the existing state jetty deposited along mean high water for disposal along the beach and/or along Hampton Beach, north of the Federal channel.

2. Open water nearshore disposal just south of Great Boars Head. (2 sites located 0.2 and 0.6 nautical miles offshore of Hampton.

3. Upland disposal behind repaired bulkhead, associated with marina reconstruction (silty material).

Environmental Considerations

Water Quality

The New Hampshire Water Supply and Pollution Control Commission (NHWSPCC) has indicated that the coastal waters in and around Hampton Harbor are classified "B" which means "acceptable for swimming and other recreation, fish habitat, and after adequate treatment, for use as water supplies" (NHWSPCC,1977; Baczynski, 1990). This designation implies a high aesthetic value.

Biological Resources of Hampton Harbor

The harbor area provides habitat for a variety of estuarine and marine organisms typical of coastal New England [CE, 1972; Public Service Company of New Hampshire (PSCNH), 1974]. The following is a brief summary of those resources.

Benthos and Shellfish

Benthic organisms in the harbor area are generally associated with bottom type and include species such as the bivalves Mya arenaria, Gemma gemma and Mytilus edulis in soft sands, the bivalve Macoma balthica, and the polychaetes Clymenella torquata, Scoloplos robustus and Spio setosa in mud or muddy sand. Common predators in both these substrates include the polychaetes Nereis spp., Nephtys sp., the moon snail Lunatia heros, hermit crabs Paguras longicarpus, rock crabs Cancer spp., green crabs Carcinus maenus, lobster Homarus americanus and the horseshoe crab Limulus polyphaemus. The channel inlet benthic populations are sparse which is typical of a high energy and continually shifting sand environment. The medium to fine sand bottom is dominated by scattered populations of rock crabs and moon snails (CE, 1972). Also present are green crabs, sand dollars (Echinarachnius parma) and lobsters along the bottom of the rock jetty. Burrowing forms include a variety of amphipods and bivalves (CE, 1972, 1991).

The soft-shelled clam Mya arenaria and the lobster are the most important species economically. The soft-shelled clam is recreationally harvested in the extensive mud flats adjacent to the tidal marshes in the inner harbor area. The clam population generally spawns and sets in the June through September period. Lobsters are found in the outer harbor near rocky outcroppings and along the jetties and are commercially and privately harvested using traditional lobster traps.

Finfish

The harbor area provides habitat for a large number of fish. The Seabrook Station Environmental Studies Baseline Characterization Report (1988) provides data on adult finfish collected in the general area from 1976 to 1988. Dominant demersal (bottom dwelling) fish community species for all years collected include the yellow flounder Limanda ferruginea, longhorn sculpin Myoxocephalus octodecemspinosus, hake species Urophycis spp., winter flounder Pseudopleuronectes americanus, Atlantic cod Gadus morhua and rainbow smelt Osmerus mordax. Rainbow smelt was the only species which was more consistently abundant in the winter throughout the study area. Catches of hake and longhorn sculpin were substantially greater in the summer.

The most abundant pelagic (oceanic) species collected during sampling was the Atlantic herring Clupea harengus. This is followed in abundance by the Atlantic whiting Merluccius bilinearis, blueback herring Alosa aestivalis, pollack Pollachius virens, Atlantic mackeral Scomber scombrus, alewife Alosa pseudoharengus and the Atlantic menhaden Brevoortia tyrannus. These pelagic species comprise 94 percent of the species collected for all of the years combined. Atlantic

whiting and mackeral were more abundant in the summer samples while Atlantic herring were more numerous in winter catches. Atlantic silversides Menidia menidia were the most dominant estuarine species collected within Hampton Harbor.

Striped bass Morone saxatilis, haddock Melanogrammus aeglefinus, Atlantic cod, pollock, Atlantic mackeral and winter flounder are the most popular sport fish of the Hampton Harbor area. The greatest sportfishing activity occurs in the spring through early fall when these species use the harbor's resources for feeding and nursing (CE. 1972).

Several anadromous fish species migrate through Hampton Harbor inlet from late spring through early summer which include alewives, the blueback herring, smelt and sea brown trout (Salmo trutta). Migration to upstream freshwater spawning areas range from April through June. Out migration occurs throughout the summer with peaks in August, September and October.

Comments received from interested agencies for the most recently proposed Federal maintenance work within the harbor have indicated a desired dredge window between early fall and early spring to avoid potential for any adverse impacts on migrating and/or spawning species.

The U.S. Fish and Wildlife Service and the National Marine Fisheries Service have indicated that the harbor does not provide critical habitat for any Federally listed endangered or threatened species. However, the New Hampshire coast is within the Atlantic flyway and hence provides potential habitat for migrating bald eagles Haliaeetus leucocephalus and peregrine falcons Falco peregrinus which are listed.

LITTLE HARBOR

Type of Material

Recent sampling and testing of Little Harbor sediments indicate that the material is mostly clean, fine sand with minor amounts of silt and clay in the inner harbor areas. Surveys performed within Little Harbor associated with dredging permit applications indicate that tidal flats on the eastern edge appear as fine sand and change to muddy sand and rock along the inner harbor areas. Chemical testing revealed low levels of contamination associated with the silt clay factions but fell well within the range suitable for ocean disposal. Most constituents tested (e.g. Zinc) were present in trace amounts but were less than corresponding average chemical concentrations for harbors throughout the Gulf of Maine. Available data seem to indicate a general spatial distribution with lower levels of contaminants being found on the eastern portions of the site with increasing concentrations to the west in the finer grained sediments. A likely source of contaminants in these sediments would be from anti-fouling paints from boats moored within the harbor areas.

Disposal Areas

Recent private dredging within the harbor was accomplished by Wentworth-By-The-Sea. The material was disposed of at the open water Cape Arundel Disposal Site.

Environmental Considerations

General

Little Harbor is located approximately one mile southwest of the entrance of Portsmouth Harbor, New Hampshire, and 70 miles north of Boston, Massachusetts. Neighboring harbors are Rye and Hampton Harbors, 4 and 12 miles respectively to the south. Little Harbor is a small, irregularly shaped tidal inlet separating the island of New Castle from the mainland. The harbor is connected at it's northwestern end to Portsmouth Harbor by a narrow thoroughfare. The mean range of tide in the harbor is 8 feet and the spring range is 9.5 feet.

Little Harbor is an embayment off the Piscataqua River which has openings to the Piscataqua to the north and the Atlantic Ocean to the south. The harbor area includes a state park, a golf course, salt marshes, tidal and intertidal areas. The area is relatively undeveloped. As a result, the biota found within the harbor will be similar to that encountered within the lower reaches of the Piscataqua River. Field surveys performed within the Little Harbor area indicate a diverse marine invertebrate population consisting of polychaetes (Streblospio benedicti, Pygospio elegans and Tharyx acutus), oligochaetes and nematodes. Bivalves include the soft-shell clam (Mya arenaria) and the blue mussel (Mytilus edulis). Lobsters (Homarus americanus) may be

found in and around the rock outcroppings. Finfish encountered include species common to the Piscataqua River such as the Atlantic silverside (Menidia menidia), winter flounder (Pseudopleuronectes americanus) and killifish (Fundulus spp.). Anadromous fish use the estuary as an access to the upper the reaches of the Piscataqua and may spawn in it's tributaries.

Type of Material

The Piscataqua River substrate is mostly sand, gravel and rock with some silt. Bulk chemical analysis was performed by the Corps on the silt portions of samples collected in October of 1989 from areas associated with the Portsmouth Harbor/Piscataqua River Navigation Improvement Project. Additional testing was conducted that year in the areas of the Federal navigation channel. This data indicated that the sediments tested (fines only) contained low to moderate levels of contaminants and were suitable for ocean disposal under the Federal Ocean Dumping Act criteria. Levels of PCBs, pesticides, PAHs, total organic carbon and oil and grease were either below detection limits or low and within the range normally encountered for coastal marine sediments. The levels of metals were low to moderate (Class I or II) under Maine dredged material guidelines.

Environmental Assessments conducted as a result of the need for periodic maintenance dredging of sections of the Federal navigation channel just north of the Interstate Highway 95 bridge indicate that the material in that portion of the channel is composed entirely of clean sand and gravel. (See ACOE 1983, 1989)

Disposal Areas

Four areas have been used for disposal of the material from the Piscataqua River:

1. The open water site at the Isle of Shoals.
2. Upland areas.
3. The Cape Arundel Disposal Site.
4. Riverine basins downstream of the project area.

Environmental Considerations

General

The Piscataqua River is formed by the confluence of the Cocheco and Salmon Falls Rivers. This tidal river also receives the flow from the Great Bays 6,200 acre tidal basin and it's associated six tributaries. The river flows southeasterly for 13 miles until it enters the ocean at Portsmouth Harbor. The prevailing topography along the river is low lying marshlands, with many inlets, creeks and embayments. The adjacent land rises gradually to 30 to 40 feet above sea level.

The Salmon Falls and Piscataqua Rivers form a natural boundary line for the state of New Hampshire and Maine. Portsmouth Harbor serves as a major commercial port, handles almost all of New Hampshire's petroleum products and also makes large shipments of fish and shellfish. Land use along the shoreline consists of a mixture of commercial and industrial port facilities and residential areas.

Water Quality

The Piscataqua River and the lower Portsmouth Harbor is one of the fastest flowing tidal waterways among commercial ports in the northeastern United States. Although there is much industrialization in the area and considerable discharge to the Piscatacqua, the area is well flushed by tidal currents. This strong semi-diurnal water exchange has the effect of diluting the pollutant loadings to an extent where water quality is within New Hampshire and Maine standards. The river is designated by the State of New Hampshire as a Class B stream segment and by the State of Maine as Class SB-1. New Hampshire Class B waters are acceptable for bathing and other recreational purposes. Maine Class SB-1 waters are suitable for water contact recreation, fishing, shellfish harvesting and propagation, and are valuable fish and wildlife habitat.

Estuarine Biology

Benthic Invertebrates

A long term study of benthic invertebrate populations in the Piscataqua River was conducted in connection with the Newington Generating Station as part of a monitoring program to assess thermal environmental impacts (Normandeau, 1979 and 1983). The relatively diverse subtidal benthic fauna was dominated by opportunistic species that included amphipods (Ampelisca abdita and A. vadorum), polychaetes (Spio filicornis, Streblospio benedicti, Polydora spp., Aricidea catherinae) and bivalves (Tellina agilis, Cerastoderma pinnulatum and Mytilus edulis). Although populations exhibited seasonal and annual fluctuations in relative abundance, species composition remained relatively constant.

Shellfish

The most significant shellfish populations exist along the banks of the Piscataqua River adjacent to the channel areas. The tidal flats in the Great Bay contain commercially important species such as the soft-shell clam (Mya arenaria) and the quahog (Mercenaria mercenaria). There are extensive blue mussel (Mytilus edulis) populations along the shore. The American oyster (Crassostrea virginica) was once plentiful in the Great Bay, but now only a small fishery exists. There has been limited commercial dragging for the deep sea scallop (Placopecten magellanicus) at the mouth of the harbor and around the Isles of Shoals.

The most important crustacean resource in the estuary system is the American Lobster (Homarus americanus) and the rock crab (Cancer irroratus). Studies for the Newington Generating Station have found that both species are abundant in the Piscataqua River. Lobsters are thought to move into the river system during the period of April to December. Diver surveys of lobster abundance associated with the generation of an Environmental Assessment for the Portsmouth Harbor Navigation Improvement Project determined that the highest concentrations were found near the mouth of the estuary.

Finfish

The productive salt marshes which line the coastal areas support a wide variety of finfish in the estuary. Abundant resident fishes include the silverside (Menidia menidia), winter flounder (Pseudopleuronectes americanus), smooth flounder (Liopsetta putnami), killifish (Fundulus spp.), sticklebacks (Gasteroteidae), tomcod (Microgadus tomcod), and grubby (Myoxocephalus aenaeus). Silversides and killifish have varying periods of inshore abundace. Both adult and juvenile flounder inhabit the eelgrass beds from spring through mid-summer. Grubby are generally found in the lower estuary, while tomcod and sticklebacks are more widely distributed.

Anadromous fishes such as smelt (Osmerus mordax), alewives (Alosa pseudoharengus), blueback herring (Alosa aestivalis) and Coho Salmon (Onchorhyncus kisutch) use the estuary and spawn in it's tributaries. Smelt enter Great Bay estuary in late fall and winter and move up and down river channels with the tides. In spring, after ice-out, spawning occurs in the tributaries. Adults then return to more saline waters and eventually leave the estuary. Alewives move into the bay and freshwater tributaries to spawn from late April or early May through June; blueback spawn at or just above tidewater during this period. Striped bass are in the estuary from late June through September, and Coho salmon begin upstream movement in September.

Endangered Species

Bird species which are listed on the U.S. Fish and Wildlife Service Endangered Species list and are known to use the New Hampshire coast as part of their habitat include the perigrine falcon (Falco peregrinus) and the bald eagle (Haliaeetus leucocephalus).

The shortnose sturgeon (Acipenser brevirostrum) is a rare and endangered species which may occur in the area. However, there exists only one record of this species occurring in the Piscataqua River and it is not certain whether there is a viable population in the area. Shortnose sturgeon spawn in the spring months in freshwater above the saline and tidal influence where the eggs are released and hatched. Once adult size, the organisms begin fall downstream and spring upstream migratory behavior.

Type of Material

Rye Harbor material is predominantly sand and silt. Sediments range from predominantly silty in the inner harbor areas to clean sand approaching the outer channel areas.

1985 sediment test data indicated that the fine grained sediments from the harbor area contained moderate levels of volatile solids, mercury, and cadmium. PCBs were detected at all stations sampled in Rye Harbor except at stations toward the outer harbor areas where PCBs were not targeted for analysis. Levels ranged from 0.30 to 0.60 parts per million (ppm) which are considered low for dredged material disposal criteria. In addition, elutriate test results indicated that there was a potential for release of contaminants (PCBs and total phosporous) to the water column which would cause water quality criteria to be exceeded. Also, ambient concentration of PCBs within the water column also exceeded water quality criteria. A 1988 Environmental Assessment, associated with the maintenance dredging of the Federal channel, suggested that these elevated levels were anomalous given the undeveloped nature of this watershed. Accidental spills of hydraulic fluids from marine related concerns or transformers could provide an explanation.

In December 1989, the Corps of Engineers retested sediments from the harbor in response to concerns on the chemical quality of the fined-grained material in the harbor. The results of physical and chemical testing performed on surface and subsurface sediments were then compared with previous years test results. Sediment metal concentrations were less than or equal to the concentration found in 1974 or 1975. PAHs were detectable at concentrations typical of the Gulf of Maine (Larsen, et al; 1986). PCBs were not detected in any of the samples.

This data can be grouped into low, moderate or high categories based on Maine's draft guidelines for disposal of dredged material. Using these guidelines, the fined grained sediments from Rye Harbor contain low level concentrations for most metals (cadmium, chromium, copper, lead, mercury and zinc) and organics (pesticides, PCBs and PAHs). Nickel and arsenic were present in low to moderate concentrations. The conclusion of this round of testing was that the levels of contaminants found within the harbor were typical of coastal marine sediments and were for the most part similar to existing background concentrations at the Cape Arundel Disposal Site. The conclusion drawn was that the material from Rye Harbor was suitable for open water disposal.

Disposal Areas

Dredged material has historically been disposed of at the Cape Arundel Disposal Site and upland areas.

Environmental Considerations

General

Rye Harbor is an estuarine embayment on the New Hampshire coast. All of the harbor has large rip-rap boulders stabilizing the intertidal and upland areas. The intertidal zones are predominantly cobble with some pocket marshes and small areas of sand. An extensive marsh system drains into the harbor area under the access roads (Route 1A bridge and Harbor Point Road bridge). These areas have minimal flow and depth at low tide.

Biological Resources

The intertidal habitat of Rye Harbor is dominated by the periwinkle (Littorina littorea) on silty-sand substrates and the blue mussel (Mytilus edulis) on the sand cobble substrates. The dominant macrobenthic infaunal component of this estuary is the soft-shelled clam, Mya arenaria, which is present in low densities. Benthic organisms, which serve as a major link between primary producers and other trophic consumers is dominated numerically by the polychaetes Cirratulus sp. and Clymenella torquata. The dominant flora consists of a small stands of Spartina alterniflora and various seaweeds, predominantly Fucus vesiculosus and Ascophyllum nodosum.

Three ecologically significant species that may be encountered in the harbor area are the steamer or soft-shelled clam, Mya arenaria, the lobster Homarus americanus and the smelt Osmarus mordax (Cortell, 1977). Dredging and disposal of Rye Harbor material should be scheduled to avoid adverse impacts on the larval and spawning activities of these species.

The soft-shelled clam would be expected to be found in greatest densities in the mid to low intertidal zones through the subtidal areas.

Sampling within these areas of the harbor revealed low densities of this shellfish. This species is tolerant of the elevated turbidities normally found in estuarine environments and would not be significantly impacted during dredging operations.

The lobster can be expected to inhabit mud burrows along the channel and the anchorage banks. These motile organisms would be expected to forage the flooded intertidal areas at high tides during the night. It is expected that these organisms have the ability to avoid dredging operations.

The harbor itself does not support any significant finfishery, with the exception of smelt (Osmeridae). The smelt, (Osmarus mordax) are anadromous residents of the New Hampshire coast. They are seasonal in occurrence, spawning in late winter and early spring, swimming upriver from the Atlantic Ocean to spawn in freshwater. They move offshore toward cooler waters in the summer. They are not residents of the harbor, only transient users. Potential adverse impacts to the resources

can be minimized by taking the appropriate operational measures. Dredging windows could be established through consultation with regulatory agencies to avoid potential negative impacts to this fishery.

APPENDIX C

REFERENCES

1. Cape Arundel Disposal Site Needs Analysis (Draft); Prepared for U.S. Environmental Protection Agency, Region I; Metcalf & Eddy, Inc., August 1991.

2. Environmental Assessment, Findings of No Significant Impact, Proposed Maintenance Dredging of the Rye Harbor Federal Channel, Rye Harbor, New Hampshire; Corps of Engineers, New England Division; 1988.

3. Environmental Assessment, Finding of No Significant Impact, Proposed Maintenance Dredging, Piscataqua River, New Hampshire; Corps of Engineers, New England Division; 1989.

4. Environmental Assessment, Proposed Maintenance Dredging of the Federal Navigation Channel at Hampton Harbor, New Hampshire; Corps of Engineers, New England Division; 1991.

5. Dredging Management: Data and Analysis for the New England/Long Island Sound Region; New England River Basins Commission, Technical Assistance Report, Dredging Management Program, September 1981.

6. General Decision Making Framework for Management of Dredged Material, Miscellaneous Paper D-91-1; Department of the Army, Waterways Experimentation Station, June 1991. Lee, C.R., Palermo, M.R., Tatem, H.E.

7. International Trade Directory - Port of New Hampshire; State Port Authority; 1992- 1993.

8. Long Term Management Strategy for Dredged Material Disposal for the Naval Weapons Station, Yorktown, Virginia, Miscellaneous Paper EL-90-8; Department of the Army, Waterways Experimentation Station, May 1990. Zappi, P.A., Palermo, M.R., and LaSalle, M.W.

9. New Hampshire Harbors: An Inventory of Resources, Uses, and Needs in relation to The New Hampshire Coastline; New Hampshire Oceanographic Foundation, December 1979. NHOF Rpt. No. 79-01

10. New Hampshire Harbors Management Project, Final Report; New Hampshire Office of State Planning, April 1991.

11. New Hampshire Long Range Dredge Management Study, Draft Final Analytical Report; New England Governor's Conference, August 1982. Costello, Lomasney & deNapoli, Inc.

12. Newington Station 1983 Monitoring Study; Prepared for Public Service Company of New Hampshire by Normandeau Associates, Inc., Bedford, New Hampshire; 1983.

13. Piscataqua River Ecological Studies 1979 Monitoring Studies; Prepared for Public Service Company of New Hampshire by Normandeau Associates, Inc., Bedford, New Hampshire; 1979.

14. Portsmouth Port Development Study - Final Report; Prepared for the Office of State Planning, State of New Hampshire by Temple, Barker, & Sloane, Inc., June 30, 1986.

15. Revised Procedural Guide for Designation Surveys of Ocean Dredged Material Disposal Sites, Technical Report D-90-8; Department of the Army, Waterways Experimentation Station, April 1990. Pequegnat, W.E. and Gallaway, B.J.

16. Seabrook Station Environmental Studies Baseline Characterization Report; Public Service Company of New Hampshire; 1988.

APPENDIX D

PERTINENT CORRESPONDENCE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254-9149

REPLY TO
ATTENTION OF

November 18, 1992

Operations Directorate
Navigation Division

Mr. Thomas Orfe
N.H. State Port Authority
Harbor Management Office
555 Market Street
Box 506
Portsmouth, NH 03801

Dear Mr. Orfe:

This is in regard to your recent phone conversation with Ed O'Donnell regarding the Federal navigation project at Little Harbor.

I have enclosed a Harbor Information Form to obtain information on project needs. Also enclosed is a copy of our definition of "Open to All on Equal Terms". This definition is intended to provide guidance as to how federally maintained navigation projects should be managed. We need to be certain that the project is being managed on this basis.

Recent sampling and testing of Little Harbor indicates the material is mainly clean fine sand. Using a 1989 survey we estimate about 270,000 cubic yards of material will need to be removed to bring the project back to authorized dimensions. Also, if an upland disposal site is to be used (usually less than a mile away from the dredging site), an area of approximately 18 acres with a 10 foot dike will be needed. I understand this is a very large area, but I would appreciate your comments on the existence and availability of such a site or combination of sites if any.

If you have any questions please contact me at (617) 647-8377.

Sincerely,

Duban Montoya
Navigation Division

APPENDIX E

LETTER OF ASSURANCE AGREEMENTS

LETTER OF ASSURANCE

HAMPTON HARBOR

ASSURANCE

OF THE

STATE OF NEW HAMPSHIRE

WHEREAS, the Navigation Project for the Improvement of Hampton Harbor, Hampton, New Hampshire, was authorized by the Chief of Engineers on 18 February 1964 under Section 107 of the River and Harbor Act of 14 July 1960; and

WHEREAS, said improvement provides for the construction of:

a. A 1,000-foot extension to the North Jetty at the Hampton Harbor entrance with a 200-foot spur at the tip;

b. The raising of the outer 300 feet of the South Jetty and a 180-foot spur to high ground;

c. An 8-foot channel, 150 feet wide across the entrance bar; and

WHEREAS, this improvement within the limits indicated on plan, entitled "Hampton Harbor, N. H., Survey Map, 1 Sheet dated October 1962, File No. 1550 D-4-4," prepared by the Corps of Engineers, United States Army Engineer Division, New England can be completed at an estimated initial cost of $325,000, not including $1,000 for Additional Navigation Aids;

a. A 1,000-foot extension to the North Jetty at the Hampton Harbor entrance with a 200-foot spur at the tip;

b. The raising of the outer 300 feet of the South Jetty and a 180-foot spur to high ground;

c. An 8-foot channel, 150 feet wide across the entrance bar; and

WHEREAS, this improvement within the limits indicated on plan, entitled "Hampton Harbor, N. H., Survey Map, 1 Sheet dated October 1962, File No. 1550 D-4-4," prepared by the Corps of Engineers, United States Army Engineer Division, New England can be completed at an estimated initial cost of $325,000, not including $1,000 for Additional Navigation Aids; and

WHEREAS, the project authorization is contingent upon compliance by local interests with certain requirements of local cooperation; and

WHEREAS, the State of New Hampshire desiring the prosecution of this project is agreeable to giving assurances satisfactory to the Secretary of the Army and the Chief of Engineers;

NOW, THEREFORE, the State of New Hampshire acting by and through its Port Authority, being duly authorized by the Governor and Council, hereby assures the United States of America that it will:

(1) Provide without cost to the United States all necessary lands, easements, and rights-of-way, including suitable spoil disposal areas, needed for the construction and maintenance of the project.

WHEREAS, the project authorization is contingent upon compliance by local interests with certain requirements of local cooperation; and

WHEREAS, the State of New Hampshire desiring the prosecution of this project is agreeable to giving assurances satisfactory to the Secretary of the Army and the Chief of Engineers;

NOW, THEREFORE, the State of New Hampshire acting by and through its Port Authority, being duly authorized by the Governor and Council, hereby assures the United States of America that it will:

(1) Provide without cost to the United States all necessary lands, easements, and rights-of-way, including suitable spoil disposal areas, needed for the construction and maintenance of the project.

(2) Hold and save the United States free from damages which may result from construction and maintenance of the project.

(3) Maintain without cost to the United States two public landings with adequate access channels and berths 6 feet deep open to all on equal terms.

(4) Maintain at least 22 acres of anchorage and access channels 6 feet deep in the harbor extending from the Route 1A Highway Bridge, without cost to the United States except for any Federal share of costs involved in procuring sand for nourishment of Hampton Beach in accordance with the authorized project therefor.

(5) Provide such beach nourishment at Seabrook Beach as may be needed to offset a possible reduction in supply because of inlet improvement.

(6) Maintain the existing State Jetties at Hampton Inlet without cost to the United States.

(7) Make a cash contribution of 41 percent of the project construction cost and assume full responsibility for all project costs in excess of the $200,000 Corps of Engineers cost limitation under Section 107 of the 1960 River and Harbor Act as necessary to provide a complete project.

IN WITNESS WHEREOF, the State of New Hampshire, acting by and

(5) Provide such beach nourishment at Seabrook Beach as may be needed to offset a possible reduction in supply because of inlet improvement.

(6) Maintain the existing State Jetties at Hampton Inlet without cost to the United States.

(7) Make a cash contribution of 41 percent of the project construction cost and assume full responsibility for all project costs in excess of the $200,000 Corps of Engineers cost limitation under Section 107 of the 1960 River and Harbor Act as necessary to provide a complete project.

IN WITNESS WHEREOF, the State of New Hampshire, acting by and through the New Hampshire State Port Authority, has executed the foregoing Assurance and caused its seal to be affixed hereto this first day of June, 1964.

NEW HAMPSHIRE STATE PORT AUTHORITY

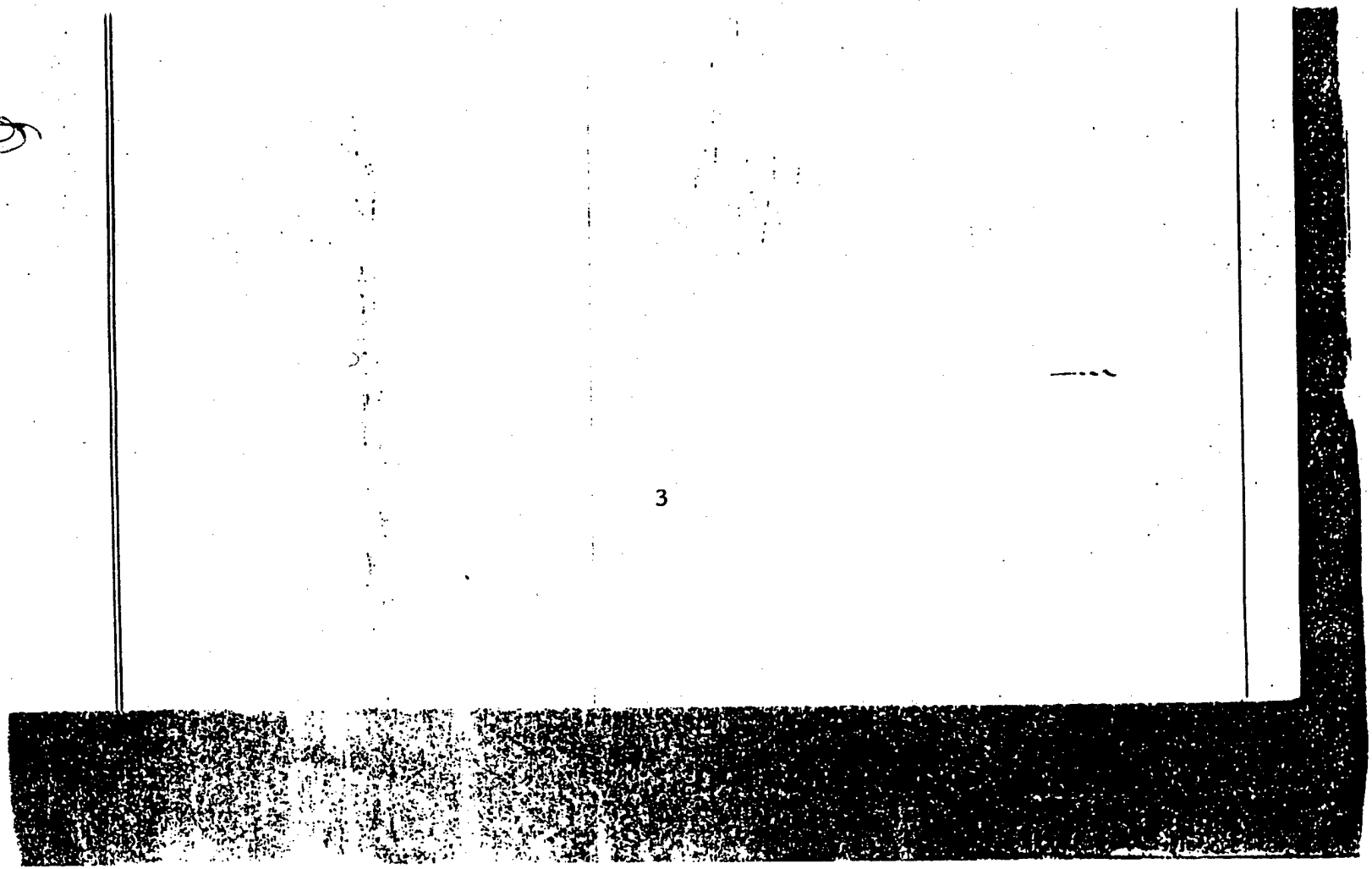
By

ACCEPTANCE

15 July 1964

The within Assurance is hereby accepted for and on behalf of the United States of America.

P. C. HYZER
Brigadier General, USA
Division Engineer



CERTIFICATE

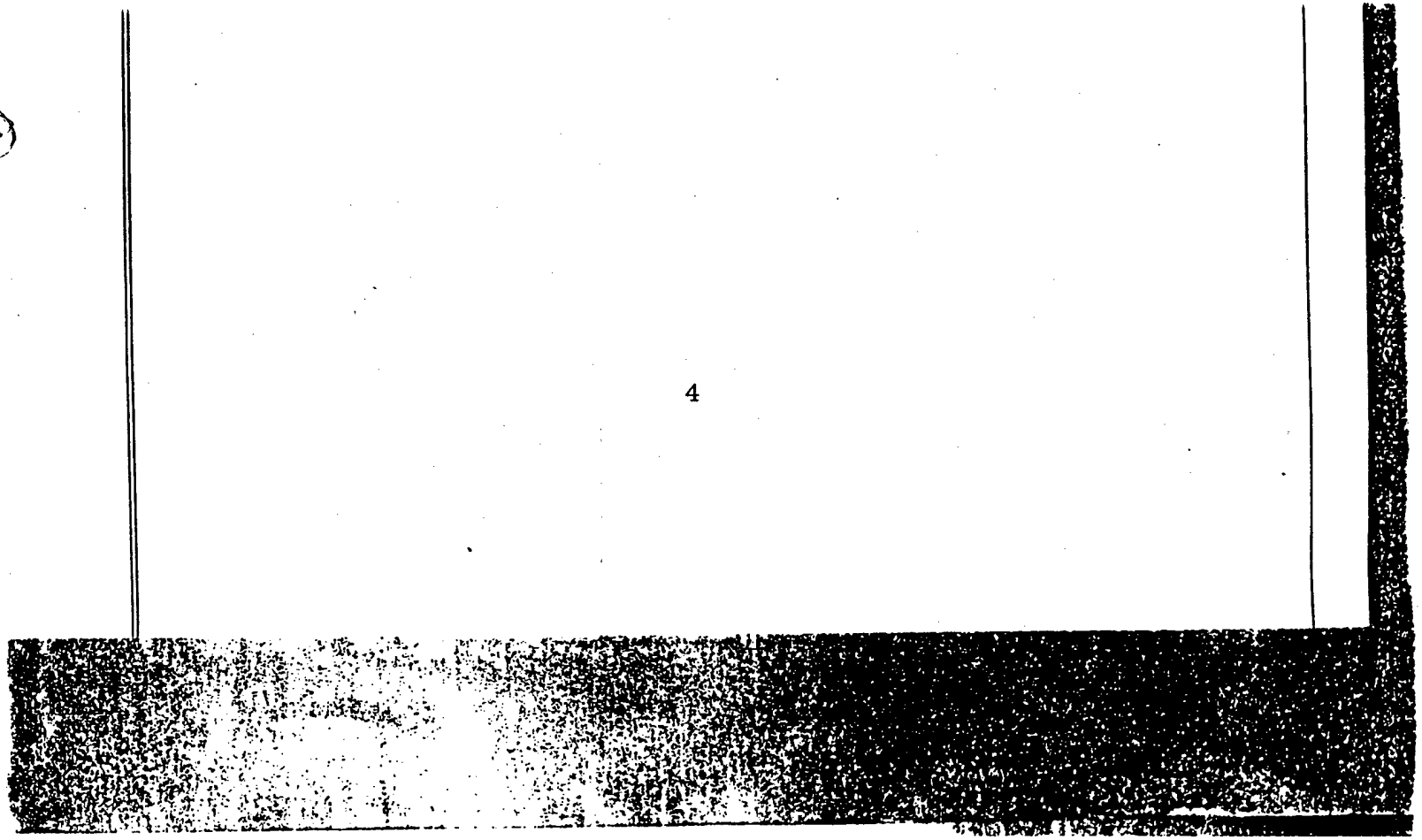
STATE OF NEW HAMPSHIRE

OFFICE OF SECRETARY OF STATE

I, Robert L Stark, Secretary of State for the State of New Hampshire, hereby certify that Eugene P. Sobin. Carl M. Lougee, John E. Seybolt, Hugh G. Hamilton, and Frank W. Fate, who signed this agreement, were officials constituting the New Hampshire State Port Authority, and that they signed said agreement for and on behalf of the State of New Hampshire by authority of its governing body and is within the scope of its corporate powers.

Robert L Stark
Secretary of State

(Official Seal)



LETTER OF ASSURANCE

PORTSMOUTH HARBOR/PISCATAQUA RIVER

& BACK CHANNELS

ASSURANCE OF THE STATE OF NEW HAMPSHIRE

PORTSMOUTH HARBOR, NEW HAMPSHIRE

WHEREAS, the project for River and Harbor construction for Portsmouth Harbor, Newhampshire authorized by the River and Harbor Act of 1879 and modified in 1890 is further modified by the Rivers and Harbors Act approved 3 September 1954 to provide for the removal of ledge-rock areas in the vicinity of Gangway Rock, the Southwest point of Badgers Island, and Boiling Rock to allow safe navigation of this section of the waterway by deep draft vessels; and

WHEREAS, the removal of ledge-rock areas to 35 feet below mean low water within the limits indicated on plans prepared by the New England Division, Corps of Engineers, United States Army can be completed at a cost now estimated to be $1,000,000. for new work plus aids to navigation; and

WHEREAS, the removal of ledge-rock as indicated above is authorized subject to the conditions that local interests furnish free of cost to the United States, all lands, easements, and rights of way (if required) for the accomplishment of the improvements and hold and save the United States free from damages due to the construction works; and

WHEREAS, the removal of said ledge-rock is to be prosecuted under the direction of the Secretary of the Army and the supervision of the Chief of

United States Army; and

safe navigation of this section of the waterway by deep draft vessels; and

WHEREAS, the removal of ledge-rock areas to 35 feet below mean low water within the limits indicated on plans prepared by the New England Division, Corps of Engineers, United States Army can be completed at a cost now estimated to be $1,000,000. for new work plus aids to navigation; and

WHEREAS, the removal of ledge-rock as indicated above is authorized subject to the conditions that local interests furnish free of cost to the United States, all lands, easements, and rights of way (if required) for the accomplishment of the improvements and hold and save the United States free from damages due to the construction works; and

WHEREAS, the removal of said ledge-rock is to be prosecuted under the direction of the Secretary of the Army and the supervision of the Chief of Engineers, Corps of Engineers, United States Army; and

WHEREAS, the local interests desire the prosecution of this project;

NOW, THEREFORE: to comply with the requirements of the Rivers and Harbors Act approved 3 September 1954, the Governor of the State of New Hampshire under authority of RSA 124 (R.L. c. 6; 1950, 5 part 25, ss. 5, 6)

Hereby assures the United States of America that the State of New Hampshire will:

(a) Provide without cost to the United States of America all lands, easements and rights-of-way, if required, for the construction of the project,

(b) Hold and save the United States of America free from damages due to the construction works.

NOW, THEREFORE: to comply with the requirements of the Rivers and Harbors Act approved 3 September 1954, the Governor of the State of New Hampshire under authority of RSA 124 (R.L. c. 6; 1950, 5 part 25, ss. 5, 6)

Hereby assures the United States of America that the State of New Hampshire will:

(a) Provide without cost to the United States of America all lands, easements and rights-of-way, if required, for the construction of the project,

(b) Hold and save the United States of America free from damages due to the construction works.

[redacted], executes the within [redacted] and causes the seal of the State of New Hampshire to be hereunto affixed this fifteenth day of September 1955.

STATE OF NEW HAMPSHIRE

by [signature]
Governor

(SEAL OF STATE OF NEW HAMPSHIRE)

Approved:
Executive Council of
State of New Hampshire

[signature]

[signature]

[signature]

[signature]

[signature]

Sept. 20 1955

The within Assurance is hereby accepted for and on behalf of the United States of America.

By [signature]
ROBERT J. FLEMING, JR.
Brigadier General, USA
Division Engineer

(SEAL OF STATE OF NEW HAMPSHIRE)

Approved:
Executive Council of
State of New Hampshire

Sept. 20 1955

The within Assurance is hereby accepted for and on behalf of the United States of America.

By _____
ROBERT J. FLEMING, JR.
Brigadier General, USA
Division Engineer

ATTEST:

Harry E. Jackson, Deputy
Secretary of State

(SEAL OF SECRETARY OF STATE)

Approved as to Form

September 15 1955

Attorney General

ATTEST:

Harry E. Jackson, Deputy
Secretary of State

(SEAL OF SECRETARY OF STATE)

Approved as to Form

September 15 19 55

[illegible]
Attorney General

ASSURANCE

OF THE

STATE OF NEW HAMPSHIRE

WHEREAS, the project for modification of the existing project at Portsmouth Harbor and Piscataqua River, New Hampshire and Maine, is authorized by Act of Congress approved October 23, 1962, Public Law 87-874, substantially in accordance with the plans and recommendations of the Chief of Engineers and House Document No. 482, 87th Congress, 2nd Session; and

WHEREAS, said authorization provides for widening the existing 35-foot Federal channel at bends by the removal of ledge rock areas in the vicinity of Henderson Point, Gangway Rock, Badgers Island, the Maine-New Hampshire Interstate Bridge and Boiling Rock; and extending the channel from above Boiling Rock to a point about 1,700 feet above the Atlantic Terminal Sales dock in Newington generally 400 feet wide, and 35 feet deep below mean low water with maneuvering basins above Boiling Rock and at the head of the project; all as shown on plan accompanying said House Document No. 482; and

WHEREAS, said improvement is approved subject to the condition that prior to construction local interests will execute certain assurances satisfac-

WHEREAS, said authorization provides for widening the existing 35-foot Federal channel at bends by the removal of ledge rock areas in the vicinity of Henderson Point, Gangway Rock, Badgers Island, the Maine-New Hampshire Interstate Bridge and Boiling Rock; and extending the channel from above Boiling Rock to a point about 1,700 feet above the Atlantic Terminal Sales dock in Newington generally 400 feet wide, and 35 feet deep below mean low water with maneuvering basins above Boiling Rock and at the head of the project; all as shown on plan accompanying said House Document No. 482; and

WHEREAS, said improvement is approved subject to the condition that prior to construction local interests will execute certain assurances satisfactory to the Secretary of the Army; and

WHEREAS, local interests desiring the prosecution of the project are agreeable that the required assurances will be executed;

NOW, THEREFORE, the State of New Hampshire, acting by and through the New Hampshire State Port Authority, being duly authorized by the Governor and Council, hereby assures the Secretary of the Army that it will:

a. Hold and save the United States free from damages due to the construction and maintenance of the improvements.

b. Provide all lands, easements and rights of way necessary for the construction and subsequent maintenance of the project and for aids to navigation upon the request of the Chief of Engineers.

agreeable that the required assurances will be executed;

NOW, THEREFORE, the State of New Hampshire, acting by and through the New Hampshire State Port Authority, being duly authorized by the Governor and Council, hereby assures the Secretary of the Army that it will:

a. Hold and save the United States free from damages due to the construction and maintenance of the improvements.

b. Provide all lands, easements and rights of way necessary for the construction and subsequent maintenance of the project and for aids to navigation upon the request of the Chief of Engineers.

c. Provide and maintain without cost to the United States depths in berthing areas and local access channels serving the terminals commensurate with the depths provided in the related project areas.

IN WITNESS WHEREOF, the State of New Hampshire, acting by and through the New Hampshire State Port Authority, has caused the foregoing Assurance to be executed and its official seal affixed hereto this 8th day of January, 1964.

Attest:

NEW HAMPSHIRE STATE PORT AUTHORITY

By

ACCEPTANCE

27 January 1964

(9)

Hugh J. Chaisson

John E. Leyden

Frank N. Tate

John F. Price

ACCEPTANCE

27 January, 1964

The within Assurance is hereby accepted for and on behalf of the United States of America.

P. C. HYZER
Brigadier General, USA
Division Engineer

CERTIFICATE

STATE OF NEW HAMPSHIRE

OFFICE OF SECRETARY OF STATE

I, Robert L Stark, Secretary of State for the State of New Hampshire, hereby certify that Eugene P. Soles, Carl M. Lougee, Hugh G. Hamilton, John E. Seybolt, Frank W. Fate, and John F. Rowe, who signed this agreement, were officials constituting the New Hampshire State Port Authority, and that they signed said agreement for and on behalf of the State of New Hampshire by authority of its governing body and is within the scope of its corporate powers.

Robert L Stark
Secretary of State

(Official Seal)

(2)

ASSURANCE
OF THE
STATE OF NEW HAMPSHIRE

WHEREAS, the project for navigation improvement for the back channels in the Portsmouth-New Castle area, approved under date of 23 December 1965 by the Chief of Engineers under authority granted by Section 107 of the River and Harbor Act of 1960, as amended by the River and Harbor Act of 1965, provides for:

(1) a channel 100 feet wide, 6 feet deep from Little Harbor through the Rye-New Castle drawbridge and then in a northerly direction between the mainland and Leachs Island to the natural deep water anchorage area south of the bridge between Shapleigh (Marvin) and Goat Islands.

(2) a channel 75 feet wide, 6 feet deep up Sagamore Creek to the Sagamore Avenue Bridge with anchorage in strips 75 feet wide, 6 feet deep, totaling 3 acres adjacent to the upper reach of the channel; and

WHEREAS, the improvement within the limits indicated in Detailed Project Report, dated June 1965, prepared by the New England Division, Corps of Engineers, can be accomplished at a total project cost presently estimated at $250,000; and

WHEREAS, said improvement is contingent upon compliance by local interests with certain requirements of local cooperation; and

proved:

Counsel

ief, Engr Div

ief, RE Div

Project Report, dated June 1965, prepared by the New England Division, Corps of Engineers, can be accomplished at a total project cost presently estimated at $250,000; and

WHEREAS, said improvement is contingent upon compliance by local interests with certain requirements of local cooperation; and

WHEREAS, the local interests desiring the prosecution of the project are agreeable to giving assurances satisfactory to the Secretary of the Army and the Chief of Engineers;

NOW, THEREFORE, the State of New Hampshire, acting by and through the Commissioner of the Department of Public Works and Highways, being duly authorized by the Governor and Council, hereby assures the United States of America that it will:

a. Provide a cash contribution of 37% of the project construction cost, said cash contribution being presently estimated at $92,500.

are agreeable to giving assurances satisfactory to the Secretary of the Army and the Chief of Engineers;

(11)

NOW, THEREFORE, the State of New Hampshire, acting by and through the Commissioner of the Department of Public Works and Highways, being duly authorized by the Governor and Council, hereby assures the United States of America that it will:

a. Provide a cash contribution of 37% of the project construction cost, said cash contribution being presently estimated at $92,500.

b. Provide, maintain and operate without cost to the United States two public landings or wharves with provisions for the sale of motor fuel, lubricants, and potable water open to all on equal terms. One landing to be located adjacent to the natural deep water anchorage area south of the Shapleigh-Goat Island Bridge, the other on Sagamore Creek located downstream of the Sagamore Avenue Bridge.

c. Construct and maintain at the public landings, piers, floats, mooring facilities and berthing areas with depths commensurate to the Federal project and open to all on equal terms.

d. Provide necessary access roads, parking areas and other needed public use shore facilities and services open to all on equal terms.

e. Provide without cost to the United States all lands, easements and rights-of-way necessary for the construction and maintenance of the project when and as required.

f. Hold and save the United States free from damages due to the construction work and maintenance of the project.

g. Make such utility and other relocations or alterations as are required for project purposes.

project and open to all on equal [illegible]

d. Provide necessary access roads, parking areas and other needed public use shore facilities and services open to all on equal terms.

e. Provide without cost to the United States all lands, easements and rights-of-way necessary for the construction and maintenance of the project when and as required.

f. Hold and save the United States free from damages due to the construction work and maintenance of the project.

g. Make such utility and other relocations or alterations as are required for project purposes.

IN WITNESS WHEREOF, the State of New Hampshire acting through and by John O. Morton, Commissioner of the Department of Public Works and Highways, has caused the within assurance to be executed this fourteenth day of September, 1966.

STATE OF NEW HAMPSHIRE

By John O. Morton
JOHN O. MORTON
Commissioner, Department of
Public Works and Highways

Approved:

_____

_____

ACCEPTANCE

6 October 1966

The within Assurance is hereby accepted for and on behalf of the United States of America.

REMI O. RENIER
Colonel, Corps of Engineers
Acting Division Engineer

CERTIFICATE

STATE OF NEW HAMPSHIRE
OFFICE OF SECRETARY OF STATE

I, Robert L Stark, Secretary of State for the State of New Hampshire, hereby certify that John O. Morton, who signed this Agreement, is the Commissioner of the Department of Public Works and Highways, and that he signed said Agreement for and on behalf of the State of New Hampshire by authority of its governing body and is within the scope of its corporate powers.

Official Seal

Robert L Stark
Secretary of State

LETTER OF ASSURANCE

RYE HARBOR

ASSURANCE

of the

STATE OF NEW HAMPSHIRE

WHEREAS, the project for Improvement of Rye Harbor, New Hampshire, is authorized by Act of Congress, approved 14 July 1960, Public Law 86-645, substantially in accordance with the plans and recommendations of the Chief of Engineers in House Document No. 439, 86th Congress, 2d Session, to provide for the dredging of a channel 100 feet wide and 10 feet deep, for a distance of 600 feet through the entrance, thence 8 feet deep, for a distance of 1700 feet within the harbor; dredging two 5-acre anchorages, one 8 feet deep, and the other 6 feet deep; and maintaining the existing breakwaters; and

WHEREAS, this project within the limits indicated on the foregoing plans can be constructed at a first cost now estimated to be $320,000; and

WHEREAS, the local interests desiring the prosecution of this project are agreeable to giving assurance satisfactory to the Secretary of

substantially in accordance with the plans and recommendations of the Chief of Engineers in House Document No. 439, 86th Congress, 2d Session, to provide for the dredging of a channel 100 feet wide and 10 feet deep, for a distance of 600 feet through the entrance, thence 8 feet deep, for a distance of 1700 feet within the harbor; dredging two 5-acre anchorages, one 8 feet deep, and the other 6 feet deep; and maintaining the existing breakwaters; and

WHEREAS, this project within the limits indicated on the foregoing plans can be constructed at a first cost now estimated to be $320,000; and

WHEREAS, the local interests desiring the prosecution of this project are agreeable to giving assurance satisfactory to the Secretary of the Army, as set forth in the said House Document.

NOW, THEREFORE, the State of New Hampshire, acting by and through the Governor and Council pursuant to Laws 1959, chapter 261, hereby assures the Secretary of the Army that it will:

a. Contribute in cash 32 per cent of the first cost of construction, such contribution presently estimated at $102,000 to be paid in a lump sum prior to initiation of construction, subject to final adjustment after actual costs have been determined;

b. Furnish without cost to the United States, title to the breakwaters constructed by local interests, and all lands, easements, rights-of-way, and properly diked spoil-disposal areas necessary for the initial con-

NOW, THEREFORE, the State of New Hampshire, acting by and through the Governor and Council pursuant to Laws 1959, chapter 261, hereby assures the Secretary of the Army that it will:

a. Contribute in cash 32 per cent of the first cost of construction, such contribution presently estimated at $102,000 to be paid in a lump sum prior to initiation of construction, subject to final adjustment after actual costs have been determined;

b. Furnish without cost to the United States, title to the breakwaters constructed by local interests, and all lands, easements, rights-of-way, and properly diked spoil-disposal areas necessary for the initial construction and subsequent maintenance, when and as required;

c. Hold and save the United States free from damages due to the construction and maintenance of the project works;

c. Provide and maintain at local expense, an adequate public landing with suitable supply facilities open to all on equal terms; and

e. Accomplish and maintain at local expense alterations as required in water supply and other facilities.

IN WITNESS WHEREOF, the State of New Hampshire, acting by and through the Governor and Council, has executed the foregoing assurance and caused its seal to be affixed hereto this 31 day of January, 1962.

Robert L Stark
Secretary of State
Witness to all

THE STATE OF NEW HAMPSHIRE

By

Governor

19 62.

(8)

Robert L Stark
Secretary of State
Witness to all

THE STATE OF NEW HAMPSHIRE

By

Governor

Councilors

Robert L Stark
Attest

ACCEPTANCE

5 March, 1962

The within Assurance is hereby accepted for and on behalf of the United States of America.

SEYMOUR A. POTTER, JR.
Brigadier General, USA
Division Engineer

(3)

Councilors

Attest

ACCEPTANCE

5 March, 1962

The within Assurance is hereby accepted for and on behalf of the United States of America.

SEYMOUR A. POTTER, JR.
Brigadier General, USA
Division Engineer